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PART I.

THE VEGETATION OF WESTERN PATAGONIA.

BY

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INTRODUCTION.

IN the years 1895–1897 I travelled in Tierra del Fuego, Patagonia, and southern Chili on a general exploration of the botany and geology of that section, but making the moss-vegetation of the several districts the subject of my particular attention. It was therefore a great pleasure to me, on my return from South America, to receive for examination, from Professor George Macloskie, of Princeton University, a collection of mosses, which had been brought home from Tierra del Fuego and Patagonia by Mr. J. B. Hatcher. Before giving an account of these mosses, I may perhaps be allowed in a few words to describe the leading features of the western Patagonian vegetation. There is, I think, all the more need for this course, as our knowledge of this vegetation is very incomplete, being founded on only a few short notes in the books of Charles Darwin, R. O. Cunningham and a few other travellers, and on statements scattered through certain purely floristic works. For the northernmost section of western Patagonia we have a couple of detailed accounts by Dr. Ch. Reiche, describing the vegetation along the Rio Manso, which flows into the Reloncavi Inlet, and that of the district around the mouths of the Rio Paléna. We have hardly any other information on the subject.

The following description of the western Patagonian vegetation is founded upon my own explorations in the westernmost parts of the Straits of Magellan, in Newton Island (lat. 51° 53′ S.), at Puerto Bueno (about 51° S.) and along Molyneux Sound (about 50° 16′ S.), also upon my observations as a member of an expedition to the Rio Aysen, the expenses of which were defrayed by the Chilian government, and during a subsequent exploration of the Guaitecas Islands (about 43° 50′ S.).

The mighty chain of the Andes, the prevailing westerly and southwesterly winds, and the influence of the Pacific Ocean are the chief factors regulating the climate of this region. In the extensive archipelago and on the western slope of the Cordillera, as might have been expected beforehand, the climate is decidedly maritime. The rainfall is considerable and, though not definitely ascertained, it may amount to about three meters per annum, and fog is the rule. In the southernmost part of the coast district severe frosts and snow are not uncommon, while in the northern section even a slight frost is very rare and snow does not occur in the islands and coast-district proper.

On the other hand, the eastern slope of the Cordillera naturally has a much drier climate, with far greater extremes of temperature for the summer and winter months than in the coast district, snow not being uncommon. Farther east the moisture of the air rapidly decreases and the steppes proper have an extremely dry climate. Judging from my own experience in the neighborhood of Lake Nahuel-huapi, the lowest winter temperature is not below 10° C. (14° F.).

The differences of climate on the two sides of the Cordillera produce a complete difference in vegetation between the two slopes. In the damp coast district very dense forests predominate, composed chiefly of evergreen beeches with small coriaceous leaves, while the forests of the eastern slope are thin and park-like, also composed of beeches, but these have deciduous leaves. The other vegetation of these two sections shows contrasts quite as striking. Farther eastward the park-like forests of deciduous trees are replaced by the Patagonian steppe. From what I saw in the upper Aysen valley, the boundary line between the evergreen and the deciduous beech forests is very marked; they do not interosculate with each other. The case is different, however, with the deciduous forests and the steppes, in so far as smaller steppes are occasionally met with in the forest region long before the wide, unbroken plain is reached. But the limit between forest and steppe appears in all cases to be well defined, the transition from one to the other being quite sudden. West Patagonia may accordingly be divided into three belts, each running parallel with the Cordillera and each with a markedly different vegetation: (1) the rainy district, comprising the archipelago and the western slope of the Cordillera, the vegetation of which may be termed the *community of evergreen beeches;* (2) the district on the eastern slope of the Cordillera, with

a moderate rainfall, the vegetation of which may be characterized as the *community of deciduous beeches;* (3) the steppe region, still farther eastward. These divisions have their counterparts in the three similar ones into which I have elsewhere divided the Magellan territory.[1]

Within the two first-named belts the forest predominates, broken in some places by smaller treeless areas, which, however, are of only secondary importance. More remarkable are the sections above the forest-line, the uplands proper. These I know only so far as the southernmost part of western Patagonia is concerned, since the above-mentioned expedition to the Rio Aysen never succeeded in reaching the end of the forest, there being such a dense undergrowth that we did not once reach an altitude above 200 meters. Owing to the limited time at my disposal the attempt had to be given up, the forest-line here running at the height of about 1000 meters. My account of the western Patagonian vegetation must therefore be deficient in that the flora of the fell or upland district can be touched upon in part only.

I. THE COMMUNITY OF EVERGREEN BEECHES.

The coast district of western Patagonia, in the whole of its length, including the archipelago, is covered with particularly dense primeval forests, very inaccessible to the traveller. This inaccessibility is due not only to the compactness of the vegetation, but also to the number of fallen and decaying trunks, which bar the way in all directions. In the southern parts of the district the undergrowth of bushes is neither very vigorous nor very diversified, but farther north it is more robust and richer in species, forming an impediment not easy to surmount. As a rule, the thickets are everywhere exceedingly dense.

A very remarkable and important feature of the vegetation is the dominant part played by the mosses and especially by the *Hepaticæ*. Whether wooded or not, the ground is everywhere entirely covered with mosses. Every decaying tree is soon lined with these plants and the living trees are more or less taken possession of by the same invaders. Some of

[1] *Dusén, P.* Ueber die Vegetation der Feuerlandischen Inselgruppe: Engler's Botanische Jahrbücher, Bd. XIV, Heft 2, 1897.

Dusén, P. Die Gefässpflanzen der Magellansländer nebst einem Beitrage zur Flora der Ostküste von Patagonien: Svenska Exped. till Magellansländerna; Bd. III, No. 5, p. 95.

these species have a very striking capacity for forming hillocks, the ground between the trees being studded with elevations, which occasionally reach the height of a man. As characteristic of this district should also be mentioned the *Stictaceæ* among the lichens and the *Hymenophyllaceæ* among the ferns.

In the northern and southern sections of this region the vegetation of the forest and thickets naturally prevents any great variety of composition. In the southern parts of western Patagonia the vegetation does not differ, on the whole, from that of the westernmost parts of the Magellan territory. In the northern section, for instance, in the Guaitecas Islands, which are the outposts to the north of the Patagonian archipelago, it is closely analogous to that of southern Chili. On the other hand, the cryptogamic vegetation is far from showing the same variety of composition and appearance in the different parts of this district. In the whole of this area it is nearly the same, and even in the Guaitecas Islands, taken all round, it has the same complexion as in the most westerly parts of the Magellan territory, although, of course, some species which occur in the one section are not found in the other.

There is no doubt, however, that the evergreen forests, especially with regard to their undergrowth, show dissimilarities enough in their different parts to justify their division into sub-sections. How such a division should be made, future explorers may decide; here I wish only to present some facts that, to me, appear to point in that direction.

In the northern parts of our district the undergrowth is, to a small extent, made up of some species of *Chusquea*, tall, robust grasses, somewhat resembling the species of *Bambusa*. The species found in the northern archipelago is characterized by its climbing propensity and it not infrequently reaches the upper parts of the trees. But it is not so common that it can be considered a very conspicuous feature of the vegetation. Whether a subdivision of the archipelago ought to be made on the basis of the occurrence of this species in one district and its absence from another, I leave an open question. According to my knowledge of the vegetation of the archipelago, such a subdivision is hardly necessary and I shall therefore include in a single total all the islands and the coast district of western Patagonia from the Straits of Magellan northward to the Ofqui-ness (about 46° 45′ S. lat.) and the coast still farther to the north.

A species of *Chusquea*, different from the insular species and probably *C. quila* Kunth,[1] occurs in the northernmost part of the mainland of west Patagonia, reaching, according to Dr. Steffen,[2] its southern limit at the Ofqui-ness. Whether this species actually occurs in the littoral districts, I do not know, but very much doubt its occurrence there. On the other hand, it is met with in enormous masses in the transverse valleys of the Cordillera, where it constitutes the great bulk of the undergrowth and is the chief obstruction to the traveller. This occurrence in masses is sufficient reason for setting apart these valleys as a separate section of the *community of evergreen beeches*, but there are other reasons also. One is that the forests here are thin or open, which makes them look like parks, and to this may be added that the ground lacks that very dense covering of mosses which, in the archipelago and littoral, is such an extremely characteristic feature of the vegetation. From the most representative plant of these transverse valleys this subsection of the evergreen beech forests may be termed the *Quila* formation.

Lastly and before proceeding to give an account of the different species that are to be found in these forests, I wish to point out their great likeness to the forests of the Tropics, especially in the north of Patagonia and, above all, in the *Quila* formation. These forests are mixed ones, their trees being evergreen with coriaceous leaves; but their undergrowth of bamboo-like grasses, the occurrence of epiphytic phanerogams, the number of ferns, especially of *Hymenophyllaceæ*, and mosses of the genera *Pilotrichella* and *Cyathophorum*, frequently in luxuriant festoons hanging from the branches, give to the forests an appearance very similar to the primeval forests of the tropical regions.

1. The Vegetation of the Southern Section of Western Patagonia.

Although, as I have already mentioned, I include together all the islands of the archipelago and the coast of the mainland, in one whole,

[1] It is stated (Cf. Frömbling: Ueber botanische Excursionen während eines dreijährigen Aufenthalt in Chile: Botan. Centralblatt, Jahrg. XVI) that the *Chusquea* grasses flower but once in three or four years, and, strange to say, all the individuals in a large district are in flower at the same time. Of the species found by me in western Patagonia not one was in bloom and trustworthy identification was therefore impossible.

[2] *Steffen, H.* Reisen in den Patagonischen Anden: Verhandl. d. Ges. für Erdkunde zu Berlin, 1900, No. 4, p. 220.

which can scarcely be subdivided, or at least, not at present, nor until the entire district shall have been carefully explored, I find it necessary, in my account of its vegetation, to treat its northern and southern parts separately. My only reason for this is the unequal number of species in the outlying sections north and south. I shall begin with the vegetation of the southern section, by which I mean the territory between the Straits of Magellan and Molyneux Sound.

The forests here are almost entirely composed of two species of trees, *Nothofagus betuloides* (Mirb.) Blume, and *Drimys winteri* Forst. The only conifer to be found here, *Libocedrus tetragona* (Hook.) Endl., can hardly be considered forest-forming. It generally grows in small, thin groves, or sparsely intermingled with *Nothofagus* and *Drimys*, as a rule, on very boggy ground. The shrub-vegetation of these forests is neither rich in species, nor very luxuriant in habit of growth, the reason of which may, I think, be found in the prevailing climatic conditions, the deficiency of light, on account of frequent fogs and a generally clouded sky, and the dark green foliage of the trees, which admits very little sunlight. There is but one species which in the twilight of these forests, and only here, attains its full development and vigor, *Lebetanthus myrsinites* (Lam.) Endl., a small, half-climbing shrub, which often entirely covers the lower parts of the tree-trunks. Other shrubs are *Desfontainea spinosa*, Ruiz et Pav., *Berberis ilicifolia* Linn. fil., and *Pernettya mucronata* (Linn. fil.) Gaud. Of other phanerogamic plants, there are scarcely any, at least where the trees stand close together, except *Callixene marginata* Lam. On the other hand, the vegetation of epiphytic ferns is all the richer, both in individuals and species. On the trunks of the trees, as well as interwoven with the mosses covering the ground and the decaying logs, grow *Hymenophyllum tortuosum* Banks et Sol., *H. pectinatum* Cav., and *H. dichotomum* Cav., not unfrequently all together. More sparingly occur *Hymenophyllum æruginosum* Cav. and *Polypodium australe* (R. Br.), besides which the ground presents to our notice two other ferns, *Asplenium magellanicum* Kaulf. and *Gleichenia quadripartita* (Lam.) Hook., the latter growing in clusters.

Of lichens the denser forests have not many to offer, as these plants do not seem to thrive well in the dim light here prevailing. The only species met with are *Sticta caulescens* De Not. and *S. filicina* Ach. (ex. p.). The mosses, especially the *Hepaticæ*, on the other hand, occur in great num-

bers, carpeting the ground and covering the fallen trees with a coating of pure green. Here thrive species of *Schistochila*, such as the pretty *S. lamellistipula* Steph. and *S. lamellata* Hook., many *Lophocoleæ* (but only one in large numbers, namely, the splendid *Lophocolea gottscheæoides* Mass.), *Tylimanthus brecknockiensis* (Mass.) Steph., numerous species of *Plagiochila*, for instance, *P. longissima* Steph., *P. elata* Tayl., *P. duricaulis* Hook. et Tayl., *P. dura* De Not., *P. obcuneata* Steph., and *P. patagonica* Besch. et Mass. Epiphytic on other mosses and on *Hymenophyllaceæ* are *Chiloscyphus striatellus* Mass., *Balantiopsis chilensis* Steph., *Mastigobryum lechleri* Steph. and *M. peruvianum* Nees, *Aneura crispa* Schffn. and *A. prehensilis* (Tayl.) Mitt., *Anthoceros endivæfolius* Mont., besides many others of less importance. The *Musci*, as I have previously stated, are sparingly represented and chiefly by species of *Pterygophyllum*, *Mniadelphus*, *Eriopus* and *Hypopterygium*. *Dicranum*, *Campylopus*, *Ulota* and other genera, elsewhere rich in species, have only a few representatives in the denser and darker forests.

Far richer in species is the flora of the less thickly wooded ground, with its better light. With the exception of *Lebetanthus myrsinites* (Lam.) Endl., the same phanerogamic plants are found here as in the denser forest. With these are associated *Philesia buxifolia* Lam., *Chiliotrichium diffusum* Forst., *Myrteola nummularia* (Poir.) Berg., *Empetrum rubrum* Vahl., *Escallonia serrata* Sm., *Acæna pumila* Vahl., *Pinguicula antarctica* Vahl., *Senecio smithii* DC., *Perezia magellanica* (Linn. fil.), Lag., *Lagenophora nudicaulis* Comm., *Phyllachne uliginosa* Forst., *Senecio trifurcatus* Less., *Tapeinia magellanica* (Lam.) Juss., *Marsipospermum grandiflorum* (Linn. fil.) Hook., *Carex microglochin* L., subsp. *fuegina* Kükenth., *Festuca commersonii* Franch., *Deschampsia kingii* (Hook. fil.) Desv., and *Blechnum magellanicum* (Desv.) Mett., besides the gregarious species, *Donatia fascicularis* Forst., *Astelia pumila* (Forst.) R. Br., *Gaimardia australis* Gaud., and *Oreobolus obtusangulus* Gaud., each of them forming large and thick clusters and often accompanied by *Tetroncium magellanicum* Willd., *Drosera uniflora* Willd., and two species of *Caltha*, *C. dioneæfolia* Hook., and *C. appendiculata* Pers., the former especially growing in compact groups.

It should be explained that by far the largest part of the ground in the thinly wooded section is occupied by mosses, which give it a yellowish brown tint, not only in the wooded places, but also in the treeless areas

higher up the mountain slope. The *Musci* are comparatively numerous and appear in masses here and there, particularly species of *Dicranum*, such as *D. imponens* Hook. fil. et Wils., *D. australe* Besch., and *D. billardieri* Schwaegr. The same applies to *Campylopus flavo-nigritus* sp. nov., and *Rhacomitrum lanuginosum* (Hedw.) Brid., to which should be added, for the higher and treeless areas, *Dicranum harioti* Besch., *Rhacocarpus humboldtii* (Spreng.) Lindb. and *R. patagonicus* Broth. n. sp., besides many species of the genus *Andreæa*. The *Hepaticæ*, however, predominate here also, and the following should be singled out because of their great abundance and because of their congregating into large mats: *Diplophyllum densifolium* Hook., *Lepicolea ochroleuca* (Spreng.) Spruce, *Schisma chilensis* De Not., *Isotachis madida* Tayl., and *Adelanthus unciformis* (Hook. et Tayl.) Mitt., besides which I should not omit to mention *Lepidolæna magellanica* Lam., *Chiloscyphus horizontalis* (Hook.) Nees, *Schistochila gayana* Gottsche and *S. pachyla* Tayl., each of these now growing in distinct tufts, or again intermingled with other mosses and conspicuous for their size or beauty, or for other reasons.

As already mentioned, the shore-thickets are very dense, being made up of some shrubs that thrive best here and scarcely occur outside of the littoral proper. The following are found closely intermingled with one another: *Escallonia serrata* Sm., *Tepualia stipularis* Gris., *Veronica elliptica* Forst., *Maytenus magellanica* (Lam.) Hook. fil., *Desfontainea spinosa* Ruiz et Pav., *Fuchsia coccinea* Ait., *Pernettya mucronata* (Linn. fil.) Gaud., *Pseudopanax lætevirens* Gay., and *Philesia buxifolia* Lam. These thickets are also the chief resort of the lichens of this district, which here appear comparatively rich both in variety of species and profusion of individuals, not only on the twigs of the bushes, but also on the ground. The following are the most important: *Pseudocyphellaria hirsuta* (Mant.) Malme, *P. fossulata* (Duf.) Malme, *P. orymæa* (Ach.) Malme, *P. orymæa*, subsp. *flavicans* (Hook. et Tayl.) Malme, *P. freycinetii* (Del.) Malme, var. *isidioloma* (Nyl.) and *Nephroma cellulosum* Ach. Nearly always on the outside of the thickets are found the phanerogamous *Cotula scariosa* (Cass.) Franch., *Apium graveolens* L. and, sparingly, *Gunnera magellanica* Lam. and *G. lobata* Hook. fil. Lastly, I may add that the twigs of the bushes are also often taken possession of by mosses, particularly by species of *Ulota* aud *Macromitrium*, such as *Ulota fulvella* Mitt. and *Macromitrium tenax* C. Müll. The vegetation of the rocks by the shore

is made up of *Crassula moschata* Forst. and of mosses belonging to the genera *Hypnum*, *Campylopus*, *Dicranum* and *Bryum*, besides a few crust lichens.

Of the flora of the fell district proper I have no personal knowledge, but am strongly inclined to believe that it does not differ materially from that of the corresponding stations of the westernmost parts of the Straits of Magellan. I think, therefore, that I should here give some of my own observations in Desolation Island, as, on the whole, they may convey an adequate idea of the flora of our upland district.

The forest-line is at the height of about 400 meters and the majority of the species belonging to the coast district extend to the same altitude; a few, such as *Crassula moschata* and *Cotula scariosa*, being restricted to the littoral, while others are met with even far above the forest-line. On or about that line is found *Nothofagus betuloides* (Forst.) Blume, a deciduous beech, appearing here as a shrub or low tree, while in Tierra del Fuego and western Patagonia, in the moderately rainy parts of which it flourishes best, it becomes a tree of considerable size. The same species occurs also on the uplands, extending up to a height of 600 meters, at least, and the higher it goes, the more stunted it is; at the upper limit of its range it is merely a small shrub, the branches of which creep along among the mosses of the ground, thus growing in the same way as the Salices and dwarf birch of the Arctic regions. There are, I dare say, few trees that vary to the same degree, from a mighty tree to an insignificant little creeper trailing along the ground. But still more in regard to its distribution this species is of very great interest. As I have already stated, it attains its full development on the eastern slope of the Cordillera. Here it descends to the lowlands at the foot of the mountains, reaching the coast about the middle of the Straits of Magellan, and it is also found in the coast district and lowlands of Fuegia. Farther west, along the Straits, it shuns the coast, and this is all the more marked as one approaches the westernmost and rainiest parts of our district. The lower limit moves continually higher and on the west coast it does not occur at all, even in the region of the evergreen beeches. That it should be altogether wanting in the coast section is very strange and seems difficult to explain, at least at first sight.

The occurrence of *Nothofagus antarctica* in the upland district is the most interesting feature of the flora. Here also the mosses predominate,

especially the *Hepaticæ*, which still appear in considerable masses. Phanerogamic plants, on the other hand, are few and far between. I have already mentioned that some of the coast species ascend to the fells, such as *Lagenophora nudicaulis* (Comm.), *Perezia magellanica* (Linn. fil.) Lag., *Senecio bifurcatus* Less., and *S. acanthifolius* Hombr. et Jacq., *Marsipospermum grandiflorum* (Linn. fil.) Hook., *Caltha dioneæfolia* Hook., and *Phyllachne uliginosa* Forst., the last two named of these extending nearly as high as the snow-line. Species found only on the fells are: *Viola tridentata* Menz., *Geum magellanicum* Comm., *Acæna antarctica* Hook. fil., *Ourisia breviflora* Benth. and *O. nana* Benth., *Saxifraga bicuspidata* Hook. fil. and *S. alboffiana* Kurtz., *Luzula antarctica* Hook. fil., *Uncinia kingii* Booth., and *Stipa rariflora* (Hook. fil.) Benth.

Of the numerous *Hepaticæ* I must not omit to mention *Anastrophyllum involutifolium* (Mont.), *Isotachis anceps* Mass., *Jamesoniella grandiflora* L. et A., *Diplophyllum clandestinum* Hook., *Lepicolea quadrilaciniata* Sull.; species of *Lophocolea*, *Leioscyphus abnormis* Mass., *L. surrepens* Tayl., and *L. turgescens* Tayl., *Lepidolæna hariotiana* Mass., *Marsupella kerguelensis* Schffn., *Schistochila splachnophylla* Tayl., and *S. pachyla* Tayl., *S. planifolia* Steph. and *S. gayana* Gottsche. Musci are comparatively scarce and many of them belong to genera which are represented also in the Arctic and Subarctic zones of the northern hemisphere, such as *Andreæa*, *Conostomum*, *Psilopilum*, *Blindia*, *Rhacomitrium* and *Dichodontium*.

2. The Vegetation of the Northernmost Parts of Western Patagonia.

Many of the phanerogamic plants enumerated above as belonging to the southern section of our district are spread over the whole of western Patagonia, including the Guaitecas Islands, of whose plants I shall now give an account. But the flora of those islands—I here refer to the phanerogamic vegetation only—is chiefly composed of elements that are wanting in the south, this difference of species being the only one that can be shown to exist between the outlying parts of our district north and south, as biologically and physiologically, hardly any can be discerned.

Nothofagus betuloides (Mirb.) Blume, so common and characteristic of the southern portion of western Patagonia, is almost entirely missing in these islands. Here it is replaced by two other species of evergreen beeches, *Nothofagus dombeyi* (Mirb.) Blume and *N. nitida* (Phil.), both of

which are the dominant trees of this locality. Like *Nothofagus betuloides* they have small, thick and coriaceous leaves. On the other hand, *Drimys winteri* Forst. is as common here as farther south, and *Libocedrus tetragona* Endl. appears to thrive even better than in the district of the Straits of Magellan. Although full-grown specimens of this tree are now hardly to be found in the Guaitecas Islands, because every full-sized trunk has been cut down, on account of its excellent wood, there is hardly any doubt that this species grows here in larger, closer and more immingled groves than in the southern section.

To the above-mentioned species I should add not a few others, which the Guaitecas have in common with south Chili and the opposite coast of western Patagonia. Without exception they are all evergreen; namely, *Laurelia aromatica* Spreng., *Caldcluvia paniculata* Don., *Weinmannia trichosperma* Cav., *Lomatia ferruginea* R. Br., *Edwardsia macnabiana* Grah., *Podocarpus nubigena* Lindl., species of the genus *Eugenia* and, of rarer occurrence, *Guevina avellana* Mol., and *Embothrium coccineum* Forst. The undergrowth of the forests and the thickets by the sea-beach likewise show a greater variety of species than is the case in the southern section.

A very remarkable feature in the vegetation of these islands is the occurrence of epiphytic phanerogams, which are represented by at least five species: *Mitraria coccinea* Cav., *Asteranthera chiloensis* Hanst et Kl., *Luzuriaga radicans* Ruiz et Pav., *Sarmienta repens* Ruiz et Pav., and one species belonging to the *Bromeliaceæ*, namely a species of *Rhodostachys*. Of parasitic phanerogams there is at least one, *Myzodendron punctulatum* Banks et Sol.

The vegetation varies, as to its component species, according to the nature of the ground. Generally, the soil consists of rock with a rather thick overlying layer of peat, produced by the mosses, which, in large masses, cover every inch of it. Here beeches and *Drimys* prevail, at the cost of other trees, while, in places where the lowland is made up of sand, the case is just the reverse. In other respects also the vegetation of the sandy places differs from what is the rule elsewhere. For instance, the grass *Chusquea*, which, as I have stated, belongs to the flora of northern Patagonia, is found here, and the ground lacks that close-woven carpeting of mosses so characteristic of the peat-covered rocks. Naturally, mosses occur even here, but are comparatively few and belong to species different from those of the beech forests proper.

An enumeration of species from different localities may give some idea of the vegetation of the Guaitecas. I shall begin with such as belong to the peat-covered, rocky ground, which takes up by far the larger part of these islands.

As already stated, the two beeches, *Nothofagus dombeyi* and *N. nitida*, and *Drimys winteri* predominate; other trees, such as *Laurelia aromatica*, *Lomatia ferruginea*, *Eugenia* sp., *Podocarpus nubigena* and *Caldcluvia paniculata*, being either of less importance or very uncommon. Whether *Weinmannia trichosperma*, *Embothrium coccineum*, *Edwardsia macnabiana* and *Guevina avellana* really occur here, I leave an open question. If so, they are at least extremely rare and of no consequence. *Libocedrus tetragona* I have already mentioned.

As is the case farther south, the light here is often very dim. Judging from the undergrowth which, in places, is more vigorous than in southern west Patagonia, it would appear that the trees do not join their crowns quite so closely together as in the latter section, although it may be that the wood-cutting, which has been going on in these islands for a long time, may have something to do with this phenomenon. The following species make up the undergrowth: *Desfontainea spinosa*, *Philesia buxifolia*, *Lebetanthus myrsinites*, *Pernettya mucronata* and *P. furens* Klotzsch., *Myrteola nummularia;* also, but more rarely, *Tecoma valdiviana* Phil., *Dacostea racemosa* Phil., and *Tepualia stipularis*. Of epiphytic phanerogams occur *Luzuriaga radicans* and very likely also *Mitraria coccinea* and *Asteranthera chiloensis*. Epiphytic ferns are plentiful, such as *Hymenophyllum chiloense* Hook., *H. magellanicum* Willd., *H. dichotomum* Cav., *H. bridgesii* Hook., *H. pectinatum* Cav., *H. cruentum* Cav., *H. æruginosum* Carm., *Trichomanes cæspitosum* Hook., *Asplenium trapezoides* Hook., and *Polypodium australe* (R. Br.). Most of these also grow on the ground, which likewise displays *Asplenium magellanicum*, *Blechnum magellanicum* and *Gleichenia quadripartita*.

The carpeting of mosses which covers the ground is composed mainly of *Hepaticæ*, but also *Bryaceæ* are more plentiful here than in the south; the species are the same as we already know from there; of the former, I should mention *Schisma chilensis*, *Lepicolea ochroleuca*, *Chiloscyphus horizontalis*, *Aneura prehensilis*, *A. fuegiana*, *A. crispa*, *Schistochila reicheana* Steph., *Plagiochila longissima* Steph., *P. obcuneata* and *P. dura* De Not., *Isotachis madida*, *Diplophyllum densifolium*, *Lepidozia chordu-*

lifera, *Mastigobryum novæ-zelandiæ* Mitt., *Lophocolea humilis* and *L. trachyopa* Tayl. Among the Musci the foremost place is occupied by species of the genus *Dicranum*, of which *D. billardieri*, *D. australe* and, generally, *D. imponens*, sometimes also *D. nigricaule* Aongstr. appear in great numbers. *Hypopterygium didictyon* and *H. thouinii*, *Hypnodendron krausei* (C. Müll.) Jacq., *Thamnium arbusculans* C. Müll., *Pterygophyllum obscurum* Mont., *Ptychomnium cygnisetum*, *Rhizogonium mnioides*, *Brentelia dumosa* Mitt., and *Pogonatum dendroides* Brid. are likewise worthy of notice.

On decaying trunks the *Hepaticæ* are represented by *Lophocolea*, *Lepidozia*, *Jamesoniella*, *Aneura*, *Schistochila*, *Isotachis*, and other genera, their commonest species being *Lophocolea anomada* (Mont.), *L. attenuata* Steph., *L. trachyopa* and *L. textilis* Tayl., *Jamesoniella colorata*, *Aneura conimitra* Steph., *Schistochila reicheana*, *Isotachis quadriloba* Steph., *Lepidozia cucullifolia* Steph. and *L. plumulosa*. Among the Musci the genus *Dicranum* again takes the leading place, with the same species as are predominant on the ground. As they are quite common, *Rhaphidostegium callidum* (Mont.) and *Stereodon lechleri* Mitt., which grow in large tufts, should not be omitted.

The moss-flora of the standing trunks is quite rich, comprising, of the *Hepaticæ*, species of *Lophocolea* and *Plagiochila*, such as *Lophocolea humilis*, *L. fulvella* (Tayl.), *L. cucullistipula* Steph., *L. otiphylla* and *L. homomalla* Steph., *Plagiochila bispinosa* Ldbg., *P. flexicaulis* Mont., and *P. dura* De Not.; further *Madotheca subsquamosa* N. et M., *Radula intempestiva* Gottsche, *Frullania stipatiloba* Steph., and *F. lobulata* Hook., *Trichocolea verticillata* Steph., and others. Worthy of mention among the Musci are, *Hypopterygium flexisetum* Hampe, *Pilotrichella krausei* Lor. and *P. cumingii* (C. Müll.) Lor.

In lichens also these forests are poor. Strictly speaking, there are only two species that one is sure to meet with, *Sphærophoron tener* Laur., and *S. compressus* Ach. One or two species of *Sticta* and *Pseudocyphellaria* do occur, but they are rare.

The thickets by the sea-shore are well developed and quite dense, which, I think, may be set down to the favorable light, which prevails outside the forest. They are chiefly made up of the following species: *Tepualia stipularis*, *Pseudopanax lætevirens*, *Desfontainea spinosa*, *Pernettya mucronata*, *Fuchsia magellanica* Lam., *Philesia buxifolia* and *Myrtus ugni*

Molina. Less important are *Eugenia* sp., *Rhaphithamnus cyanocarpus* Miers, *Tecoma valdiviana*, *Dacostea ruscifolia* Clos. and *D. racemosa*, *Pernettya furens* and *Berberis darwinii* Hook. *Eugenia* sp. occasionally occurs in dense copses and then generally together with *Blechnum magellanicum*. *Hymenophyllaceæ* also are plentiful in the thickets of the seashore, and to those species that I have mentioned before I may now add *Hymenophyllum caudiculatum* Hook.

In the littoral belt the lichens have their proper abode, occurring here in large masses. They belong almost exclusively to the genus *Pseudocyphellaria*, the following species being the most important: *P. fossulata* (Del.) Malme, *P. faveolata* (Del.) Malme, var. *cervicornis* (Flot.), *P. orygmæa* (Ach.) *P. urvillei* (Del.) Malme, *P. orygmæa* (Ach.) *flavicans* (Hook. et Tayl.) Malme, *P. nitida* (Tayl.) Malme, and *P. freycinetii* (Del.) Malme.

On the cliffs by the shore the vegetation is, as a rule, very poor in species. I should mention as occurring here some phanerogamic plants, as *Cotula scariosa*, *Crassula moschata*, *Colobanthus quitensis* Barth., *Juncus planifolius* R. Br., var. *demissus* Buch., and *Aira caryophyllea*, L.; of Musci, *Macromitrium bifasciculare* sp. nov., and *Barbula microruncinata* sp. nov.; and of Lichens, *Stereococaulon ramulosum* (Sw.) Ach., together with its variety *implexum* Th. Fr.

On sandy ground, which occurs only along the small bays, the vegetation of the forest is somewhat different; also that of the thickets, and especially that of the herbaceous plants, is denser here than elsewhere.

At Puerto Low, a cave on the northern side of the main island, Isla Guaiteca, the vegetation is disposed as follows: Next to the shore is a low belt, chiefly taken up by *Juncaceæ* and *Gramineæ*, next comes a belt of thickets and then the virgin forest. In the outermost belt *Deschampsia kingii* (Hook. fil.) Desv., *Elymus* sp., *Poa fuegiana* (Hook. fil.) and *Juncus lesueurii* Bol., predominate, more or less richly intermingled with the following species: *Cerastium arvense* L., *Lathyrus magellanicus* Lam. and *L. maritimus* (L.) Big., *Senecio otites* Kze. and *S. smithii* DC., *Acæna ovalifolia* Ruiz et Pav., *Galium relbun* Endl., *Libertia elegans* Poepp., *Sonchus fallax* Waltr., *Polygonum chilense* Koch, *Rumex* sp., *Cardamine ovata* Phil., *Solanum furcatum* Poir., *Apium graveolens* L., *Baccharis sagittalis* DC., *Lepidium bipinnatifidum* Desv., *Hydrocotyle* sp. (sterile), *Cotula scariosa*, *Ranunculus chilensis* DC., *Selliera radicans*

Pers., *Tetragonia expansa* Ait., *Ambrina ambrosioides* Spach., *Plantago lanceolata* L., *Stachys chonotica* Hook. fil., *Stellaria cuspidata* Willd., *Uncinia phleoides* Pers., *Carex* sp., presumably *C. darwinii* Boott. and *Blechnum chilense* (Kaulf.) Mett.

The belt of thickets is chiefly composed of *Rhaphithamnus cyanocarpus* Miers, a couple of species of *Eugenia*, *Fuchsia magellanica* and *Escallonia macrantha* Hook. et Arn. More sparingly occur *Berberis darwinii* and *B. microphylla*, *Ribes magellanicum* Poir., *Cynoctonum pachyphyllum* Decaisne, *Myrtus ugni* and *Pseudopanax lætevirens*. *Mitraria coccinea* is here rare. Both of the outer belts have a width of only a few meters each.

The most important constituents of the forest are *Caldcluvia paniculata*, *Laurelia aromatica*, *Weinmannia trichosperma*, *Lomatia ferruginea* and *Drimys winteri*. Though not absent, the two species of beech, *Nothofagus dombeyi* and *N. nitida*, are not conspicuous here. This forest is considerably taller and less dense than the beech-forest and consequently admits more light than the latter. The undergrowth, therefore, at least in places, is very luxuriant, its most conspicuous element being the *Chusquea* grass already referred to, probably *C. valdiviensis* Desv., the climbing propensities of which I have pointed out. In more open and lighter places it becomes very dense, but elsewhere only sparingly so. Besides these, the highest plants of the undergrowth are *Pseudopanax lætevirens*, *Rhaphithamnus cyanocarpus*, a couple of *Eugenia* species, *Tepualia stipularis*, *Dacostea ruscifolia*, *Myoschilos oblongus* Ruiz et Pav., *Philesia buxifolia*, *Myrtus ugni* Molina, *Tecoma valdiviana* and *Lebetanthus americanus*. Of epiphytic plants, *Mitraria coccinea*, *Asteranthera chiloensis*, *Luzuriaga radicans* and *Sarmienta repens* are common, the last named not unfrequently occurring in masses on sloping tree-trunks. *Rhodostachys* sp., probably *R. littoralis* Phil., on the other hand, is rare and restricted to the outskirts of the forest. Besides, the trunks are richly clothed with *Hymenophyllaceæ* and a few other ferns, and with mosses, of which I should mention *Hypopterygium flexisetum*, *Pilotrichella krausei* and *P. cumingii*, *Metzgeria glaberrima* Steph., *Plagiochila uncialis*, and *P. lechleri*, *Madotheca subsquarrosa* N. et M. and *Frullania chilensis* Steph.

A lower order of the undergrowth is composed of a few scattered herbs, such as *Osmorhiza berterii* DC., *Nertera depressa* Banks, *Uncinia phleoides* and *U. erinacea* Pers., and *Blechnum chilense*. The moss carpeting is comparatively scanty and *Hepaticæ* are scarce, their most important

representatives being *Rigodium toxarion* (Schwaegr.) Schimp., *Hypnodendron krausei, Thamnium arbusculans* and *Monoclea forsteri* (Hook.).

From what has just been said, it will appear that the forest vegetation of the Guaitecas Islands is very different from that of the southern sections of our district, being in fact distinctly allied to that of Chiloë and southern Chili. Certain portions of the Guaitecas, however, have a vegetation, in which the southern Patagonian and Fuegian elements prevail, while the south Chilian forms are altogether wanting, or very poorly represented. Such is the case with the vegetation of the peat-bogs and also of the higher and treeless portions of the islands.

Peat Bogs.

In western Patagonia peat-bogs are rather uncommon and in our territory I know of such only in the Guaitecas. These bogs have exactly the same appearance as those of the north of Europe. The great bulk of their vegetation consists of *Sphagnaceæ*, belonging to the same species as those of the bogs of southern Sweden. The phanerogamic bog-vegetation of two districts so widely distant from each other, so far as their several species are concerned, has very little in common, but, in some cases, quite evidently shows a morphological correspondence.

The bed of *Sphagnum* is not altogether continuous, but is broken in spots by solid patches of phanerogamic plants; namely, *Donatia fascicularis, Astelia pumila, Gaimardia australis,* and *Oreobolus obtusangulus,* all of which I have already stated to belong to the southern sections of our district and which also enter into the Fuegian flora. Even Musci, such as *Dicranum australe*, and *D. billardieri, Campylopus flavo-nigritus*, sp. nov., and *Rhacomitrium lanuginosum*, occasionally break the continuity of the masses of *Sphagnum*. Species of *Hepaticæ* occur along with them, as *Schisma chilensis*, *Lepicolea ochroleuca*, *Diplophyllum densifolium* and *Lepidozia saddlensis*, but their assistance in producing the peat is very limited. A couple of lichens, *Cladonia pycnoclada* (Pers.) and a species of *Pseudocyphellaria* likewise belong to the bog-vegetation.

Besides the phanerogamic plants above enumerated, several others should also be mentioned. *Schœnodon chilensis* Gay. occasionally occurs in groups, but, on the other hand, I did not see *Scirpus riparius* Presl., though it may have grown here once. I noticed it, together with *Schœnodon*, growing in profusion by a lagoon, by the shore of which *Sphagna-*

ceæ were evidently advancing. The production of peat was in full swing here, and part of the lagoon was already invaded by peat-producing plants. Both the species named seemed to be of importance in the first stage of peat production and to play the same part here as *Phragmites* does in the formation of the Scandinavian bogs. On the mounds of *Sphagnum, Empetrum rubrum* Vahl. is abundant, generally together with the species of *Pseudocyphellaria* named above. Low shrubs of *Tepualia stipularis, Pernettya mucronata, Philesia buxifolia* and *Baccharis* sp. occur sparingly on these mounds, sometimes also *Blechnum pinna-marina. Libocedrus tetragona* and dwarfed specimens of *Nothofagus betuloides* are far from common; the latter should, in all probability, be regarded as on the point of extinction.

Drosera uniflora and *Pinguicula antarctica* are met with on the sward-like beds of *Gaimardia*, as well as on those of *Sphagnum*. In places, *Tetroncium magellanicum* and *Schizæa australis* Gaud. form small groups, and *Myrteola nummularia* is common. *Carex microglochin* Wahl. var. *fuegina* Kükenth. and *magellanica* Lam., *Carpha schœnoides* Banks et Sol. and *Deschampsia kingii* are rather scarce. Of the phanerogamic plants enumerated as peculiar to the peat-bogs, only one, *Schœnodon chilensis*, and also the fern *Schizæa australis*, are absent from west Patagonia and Fuegia, although the latter may be found there, as it is known from the Falkland Islands.

From a morphological point of view the phanerogamic flora of the peat-bogs of the Guaitecas shows many similarities with that of the Scandinavian bogs. For instance, *Empetrum rubrum* exactly resembles in habit *Empetrum nigrum* L., and *Carex magellanica* is common to both districts. *Tetroncium magellanicum* has its morphological counterpart northwards in *Narthecium ossifragum* Huds., and *Myrteola nummularia* in *Oxycoccus palustris* Pers. But in many cases, naturally, such a correspondence does not exist. Thus *Eriophorum vaginatum* L., so common in Scandinavian bogs, has no morphological counterpart in the Patagonian, just as, vice versà, *Donatia, Astelia, Oreobolus* and *Gaimardia* have none in the Scandinavian peat-bogs.

It now remains for me to give some account of the vegetation of the higher and treeless portions of these islands. They were once wooded, partly at least, but their trees have either been cut down or destroyed by fires. In places the forest is now regaining its lost ground.

These treeless slopes are covered with a carpet of mosses, as thick and unbroken as that of the ground in the beech forests just described. On the whole, the same species occur here as in the beech district, with an occasional solitary mound of *Sphagnum*. Thickets are common and consist of almost the same species as those forming the undergrowth in the beech forests, sometimes associated with that splendid fern, *Alsophila pruinata*, in considerable quantities. There are also less dense thickets made up exclusively or almost exclusively of *Lepidothamnus foncki* Phil., a very remarkable shrub belonging to the *Coniferæ* and scarcely reaching the height of one meter.

The vegetation of these slopes, in many respects, naturally reminds one of the undergrowth in the typical virgin forests, but, at the same time, it has some features in common with the flora of the peat-bogs. For example, *Drosera uniflora*, *Pinguicula antarctica*, *Astelia pumila*, *Gaimardia australis*, *Oreobolus obtusangulus*, *Myrteola nummularia*, *Blechnum pinnamarina* and *Schizæa australis* are met with in places, all of these belonging to the bog vegetation.

Certain spaces on these slopes are in the course of transformation into tree-bearing ground, *Libocedrus tetragona* taking possession almost exclusively. The beeches are probably far behind-hand, and may be at a disadvantage because their nuts are less adapted for transportation. At the time of my exploration of the Guaitecas Islands the groves of *Libocedrus* were about man-high. Judging from their quite considerable density and extension, it will appear that this species of conifer is of far greater importance here than in the southern section.

3. The Vegetation of the Rio Aysen Valley.

1. *The Community of Evergreen Beeches.*

At about 45° 23′ 30″ S. Lat. the Rio Aysen reaches the Pacific, having cut its way through the whole of the west Patagonian Cordillera. In the district around its mouth in the Firth of Aysen, which penetrates far into the mountain chain, the rainfall is evidently very much less than in the coast district and the islands. This is manifestly proved by the vegetation, as that compact carpeting of mosses, which is such a characteristic feature of the outer coast district, is entirely wanting here, which cannot otherwise be accounted for than by reason of the rainfall's being less in the Aysen valley than on the coast proper.

Although the plant growth of the lower and middle parts of the Aysen valley differs in some other respects also, besides the one just named, from that of the coast district, it must be regarded in a general way as belonging to the community of evergreen beeches. However, as I have pointed out, we are quite justified in setting apart the vegetation of this valley, and of others within the northern section of west Patagonia, as a separate section of the community of evergreen beeches. This part may appropriately be called the *Quila* formation. Even this is not uniform throughout and might therefore be further subdivided, the vegetation of the river-banks and islands, for instance, being very different from that of other parts of the valley. But such a subdivision of the vegetation of the Aysen valley into smaller sections I shall not now attempt, since it is not necessary for my present purpose.

A short journey up the river is sufficient to show how different its vegetation is from that of the coast district. It exhibits forms which could hardly be expected to occur here, and which agree better with the flora of a tropical country than with that of temperate regions. In particular, it contains two species, *Gunnera chilensis* Lam., and *Chusquea quila* Kunth, that remind one of the luxuriance and magnificence of the tropical floras, the former growing here and there in groups on the river bank, and extending as far up the river as the evergreen beeches. The flower stalks of the first of these plants, which resembles a species of *Rheum*, are more than man-high, the diameter of its rounded, lobed leaves frequently exceeding two meters. The *Chusquea* plays a dominant part in making up the undergrowth, and fills, almost uninterruptedly, the spaces between the trees of the park-like forest, forcing its way to the river banks in compact masses. It is a grass four to five meters high, with stalks standing close together, three to four centimeters thick and as hard as bamboo, forming a great impediment to the traveller's progress and, except in rare cases, necessitating the use of the axe. Of the density of the undergrowth the following will give a good idea. Our expedition[1] occupied seven weeks in going from the mouth of the Rio Aysen to

[1] The members of this expedition — which was sent out by the Chilian government for the delimitation of the frontier between Chili and Argentina, and the main object of which was to ascertain the interoceanic water-shed of the district around the sources of the Rio Aysen — were, in addition to myself, Dr. Hans Steffen, leader; Mr. De Fischer, Danish cartographer, and Messrs. Horn and von Bronsart Schellendorf, German officers. Besides, twenty-five Indians, of more or less pure breed, were employed as porters and pioneers.

the first steppes of the eastern slope of the Cordillera; of that time, about one week was lost through rain, the boat-journey up the river lasted three weeks, and it required just the same time to cut our way through the remaining twenty-five kilometers of forest. The journey back to the coast was done in five days, but could easily have been completed in less time.

Of the species of trees which characterize the forests of the lower and middle Aysen valley, *Nothofagus dombeyi* is decidedly the most important. *N. nitida* is of no great account here and is hardly to be found outside the district around the mouth of the river. Other trees occurring here are *Lomatia ferruginea, Laurelia aromatica, Eugenia* sp., *Caldcluvia paniculata, Drimys winteri, Embothrium coccineum, Podocarpus nubigena, Saxegothea conspicua* Lindl., *Weinmannia trichosperma* and *Edwardsia macnabiana*, the last of which appears to be restricted to the river banks. Rarely, and only on the islands and at the river side, occur *Nothofagus antarctica* and *N. pumilio*. Both, certainly, are only occasional guests here, their seeds doubtless having been carried down from the upper valley, where the deciduous beeches are at home. They are the only deciduous trees of that section of the Aysen valley, the flora of which we are considering.

The trees do not stand very close together and the light falling on the ground should presumably be sufficient for a comparatively rich undergrowth, were it not kept down by the *Chusquea* grasses. Where these grow most densely — which is especially the case on alluvial soil — almost all trace of other vegetation is wanting, the ground beneath its covering of fallen and faded *Chusquea* leaves and between their stalks being quite bare. In places where the ground is quite stony and where smaller streams rush or trickle down to the river, the *Chusquea* grass, as a rule, grows less closely and an undergrowth of bushes and herbs is to be found, though but poorly developed. On the other hand, the mosses in such places are often rich or even luxuriant. From time to time a falling tree kills some of the mighty *Chusquea* mounds and the clearings thus made are soon, though probably for only a short time, taken possession of by an undergrowth of shrubs, which is sometimes rather dense. The species composing it are the following: *Tecoma valdiviana, Cynoctomum pachyphyllum* Dcne, *Dacostea ruscifolia* Clos, *Azara lanceolata* Hook. fil., *Daphne pillopillo* Gay., *Philesia buxifolia* and *Senecio cymosus* Remy, the three last named of which were found only once. The herbaceous vege-

tation is likewise not rich in species, consisting only of *Nertera depressa*, *Urtica magellanica* Poir., *Pilea elliptica* Hook. fil., *Uncinia phleoides*, *Rubus geoides* Sm., and *Osmorhiza berterii*. Of ferns I should mention *Phegopteris spectabilis* Fée, *Aspidium orbiculatum* Desv. and *A. multifidum* Mett., *Blechnum pinna-marina* and *B. chilense* and *Alsophila pruinata*, all of them rare.

The vegetation of epiphytic phanerogams includes three species, *Mitraria coccinea*, *Asteranthera chiloensis* and *Luzuriaga radicans*, all very common. Of parasitic plants I noticed only *Myzodendron punctulatum* and *M. oblongifolium* DC. Particularly interesting is the occurrence of lianas in these forests, although they have only one representative here, *Hydrangea scandens* Poepp., the most powerful liana of Chili and western Patagonia. It is one of the most ornamental plants of the landscape and where, as is often the case, it covers the broken trunks in profusion, it offers an attractive sight with its rich display of clusters of white flowers.

Only on the islands and river banks is a more luxuriant vegetation to be found. *Fuchsia magellanica*, *Escallonia macrostemma*, *Aristotelia magni* L'Her. and *Tepualia stipularis* here grow in dense, almost impenetrable thickets. The vegetation of herbs is rich in species, owing to a steady migration of plants from the upper courses of the river. The seeds are carried along by the current and deposited on the banks and islands, but these immigrant plants would soon be eliminated from the strand flora by the annual overflowing of the river and the deposition of its sediments, if there were not a constant supply of fresh individuals always coming down. In a similar way have been added a few representatives of the Alpine flora of the mountains surrounding the valley. In the following list of the most important elements of the flora of the river banks and islands those species which have migrated from the district of the deciduous beeches are marked thus * and those from the Alpine flora thus **.

Pernettya mucronata Gaud.
furens Klotzsch.
Baccharis palenæ Phil.
* *Colletia spinosa* Lam.
* *Discaria discolor* (Hook.).
Tepualia stipularis Gris.
Aristotelia magni L'Her.
Pseudopanax lætevirens (Gay.).
Maytenus magellanica (Lam.) Hook.
Ribes sp. (probably *R. magellanicum* Poir.).
* * *Senecio trifurcatus* Less.
* *danyausii* Hombr. et Jacq.
* *argenteus* Kze.
* *dusenii* O. Hoffm. sp. nov.
otites Kze.
Gnaphalium pratense Phil.
* *Mutisia retusa* Remy.
* *Nassauvia dusenii* O. Hoffm. sp. nov.

* *Solidago chilensis* Meyen.
* * *Lagenophora nudicaulis* (Comm.).
* * *Perezia magellanica* (Linn. fil.) Lag.
* *Madia sativa* Mol.
* *Heterothalamus nivalis* (Schultz Bip.) Wedd.
* *Haplopappus coronopifolius* DC.
Sonchus fallax Wallr.
* *Erigeron sordidus* Gill.
* *Hypochœris arenaria* Gaud.
Valeriana lapathifolia Vahl.
virescens Clos.
* *Galium aparine* L.
* *Galium relbun* Endl.
* *Limosella aquatica* L.
Calceolaria tenella Poepp. et Endl.
* *Lathyrus magellanicus* Lam.
* *Geum magellanicum* Comm.
* *Fragaria chilensis* Ehrh.
* *Acæna adscendens* Vahl.
* *pinnatifida* Ruiz et Pav.
* *splendens* Hook. et Arn.
ovalifolia Ruiz et Pav.
* *lævigata* Ait.
Crassula paludosa (Schltd.).
Cardamine ovata Phil.
* *Anemone multifida* Poir.
Ranunculus chilensis DC.
peduncularis Sm.
obtusatus Poepp.
Stellaria cuspidata Willd.
* *Arenaria serpylloides* Naud. *andicola* Gill.
* *Rumex decumbens* Dusén.
Libertia elegans Poepp.
Codonorchis lessonii (d'Urv.) Lindl.
* *Urtica magellanica* Poir.
* *Cerastium arvense* L.
* * *Marsipospermum grandiflorum* (Linn. fil.) Hook.
Juncus stipulatus Nees et Meyen.
lesueurii Bol.
procerus Meyer.
bufonius L.
* *Luzula racemosa* Desv.
Heleocharis melanostachys (d'Urv.).
Scirpus cernuus Vahl.
* *Carex filiformis* L. subsp. *æmatorhyncha* Desv., f. *gracilis*.
pseudocyperus L. subsp. *haenkeana* Presl.
darwinii Boott var. *robustior* Kükenth.
* *decidua* Boott.
Fuchsia magellanica Lam.
Berberis darwinii Hook.
* *microphylla* Forst.
* *empetrifolia* Lam.
* *Escallonia rubra* Pers.
stricta Remy.
macrantha Hook. et Arn.
Raphithamnus cyanocarpus Miers.
Veronica fonkii Phil. (in the district around the mouth of the river).
* *Calceolaria darwinii* Benth.
Veronica peregrina L.
Mimulus lutens L.
* *Phacelia circinata* Jacq.
* *Collomia gracilis* Dougl.
* * *Pernettya leucocarpa* Phil.
* *Azorella trifurcata* (Gaerth) Hook.
* *Mulinum spinosum* Pers.
* *Osmorhiza berterii* DC.
Apium graveolens L.
* *Myriophyllum verticillatum* L.
Gunnera magellanica Lam.
chilensis Lam.
Epilobium glaucum Hanskn. et Phil.
* *Œnothera stricta* Ledeb.
Viola maculata Cav.
* *Empetrum rubrum* Vahl.
* *Geranium magellanicum* Hook. fil.
* *Astragalus brevicaulis* Dusén.
* *Adesmia* (*Patagonium*) *boronioides* Hook. fil.
* *retusa* Gris.
Vicia patagonica Hook. fil.
daropskyana Phil.
* *Alopecurus alpinus* Sm.
* *Phleum alpinum* L.
* *Agrostis montevidensis* Spr. var. *submutica* Doell.
* *Calamagrostis stricta* Beauv.
* *Deschampsia flexuosa* (L.) Trin.
kingii (Hook. fil.) Desv.

Deschampsia aciphylla (Franch.) Speg.
* *Trisetum subspicatum* Beauv. var. *glabrifolium* Hook.
* *Cortaderia pilosa* (d'Urv.) Hack.
* *araucana* Stapf.
* *Poa nemoralis* L. var. *magellanica* Hack.
* *Poa scaberula* Hook. fil.
fuegiana (Hook. fil.) Hack.
Glyceria fluitans R. Br. var. *stricta* Desv.
* *Festuca purpurascens* Banks et Sol.
* *Bromus catharticus* Mol.
* *albowianus* Kurtz.
* *Hordeum comosum* Presl.
* *secalinum* Schreb. var. *chilense* Desv.
Equisetum bogotense H.B.K.
Mertensia cryptocarpa Fée.

It is true that some of the species here indicated as immigrants, were not found either in the district of deciduous beeches, or on the steppes, but as I observed that they grew sparsely and only in the upper part of the section of the valley now in question, I think there is no doubt of their migration. Such species are: *Senecio dusenii*, *Nassauvia dusenii*, *Haplopappus coronopifolius*, *Arenaria serpylloides* var. *andicola*, *Rumex decumbens*, *Cortaderia araucana* and *Poa scaberula*, all of which, except the last, presumably have their home in the western section of the steppe district. Very likely the number of species carried down by the river is actually greater than I have given in the above list.

In the *Quila*-formation the mosses do not rank nearly so high as in the coast district and, on the whole, the moss-flora of the Aysen valley differs largely from that of the coast, this being true especially of the Musci proper. So far as the *Hepaticæ* are concerned, the disparity is not quite so marked, not a few species being common to both districts. Nevertheless, those species characteristic of the coast are wanting in the valley, and if one or other of them is occasionally found, it is always sparingly, so that they never play an important part here. Besides this, *Hepaticæ*, with a few exceptions, occur in comparatively small numbers, Musci taking the lead both in species and individuals.

Of epiphytic *Hepaticæ* the following are of importance: *Plagiochila rufescens* Steph., *P. bispinosa* Ldbg., *P. uncialis* and *P. flexicaulis*, only the last named occurring numerously now and then; further *Lophocolea conifolia* Steph., *L. fulvella*, *L. gayana*, *L. humilis*, *L. irregularis* Steph., *L. cucullistipula* Steph. and *L. navicularis* Steph., of which the last two are the commonest and have the widest range. *Chiloscyphus paraphyllinus* Steph., *Trichocolea verticillata*, *Radula plumosa* and *R. tenera*, *Madotheca recurva* Tayl. and *M. gracilenta* Tayl., these last two being common and often plentiful; *Frullania boveana* Mass. and *F. lobulata*

Hook., besides the epiphyllic *Cololejeunea asperrima* Steph. and *Eulejeunea patagonica* Steph.

Among the epiphytic Musci some are conspicuous by their not uncommon occurrence in large masses, such being *Pilotrichella cumingii* and the magnificent *Cyathophorum splendidissimum* (Mont.) Hpe. et Lor. These and a few others of the mosses of the Aysen valley belong to genera which have their proper home in the Tropics. Of some importance also are *Hookeria ancistroides* Mont., *Neckera chilensis* Schpr., *Ptychomnium ptychocarpum* (Schwaegr.) Mitt., *Cryphæa consimilis* Mont., *Rigodium nano-fasciculatum* C. Müll., *Dicranum capillifolium* Broth. sp. nov., *Ectropothecium spirifolium* sp. nov., *Daltonia krauseana* C. Müll. and *D. affinis* sp. nov., *Barbula crispatula* C. Müll. and *B. flagellaris* Schpr., *Eriopus odontoloma* sp. nov., *Orthotrichum nigritellum* sp. nov., *Cladomnium gracile* (Hpe.) Mitt., *Ulota fulvella* Mitt. and *U. macrodonta* sp. nov., *Amphidium cyathicarpum* (Mont.) Jaeg., *Pentastichella pentasticha* (Mont.) C. Müll., *Lepyrodon implexus* (Kze.) Par. and *L. lagurus* (Hook.) Mitt., *Eriodon conostomus* Mont. and *Rhaphidostegium polytrichadelphus* sp. nov., the last named living on *Pogonatum dendroides*.

On decaying trunks Musci are poorly represented, while *Hepaticæ* are here comparatively rich in species. Of the former *Rhaphidostegium callidum* (Mont.) Jaeg. and *Acrocladium auriculatum* Mitt. are the foremost, being the only ones which occur *en masse*, at least within the forest proper. On stones by the river and particularly on trunks fallen or stranded on its banks, provided they are placed below high-water mark, *Dendrocryphæa gorveana* (Mont.) Par. et Schpr. also occurs in very large numbers. *Scouleria patagonica* (Mitt.) Jaeg., likewise abundant, lives in the same way, although it prefers the stones; this species, by the way, being replaced on the stones higher up the river by large masses of *Sciaromium confluens* (C. Müll.) Par.

Of *Hepaticæ* living on decaying logs I may name *Aneura autoica* Steph. and *A. pulvinata* Steph., *Lophozea dusenii* Steph., *Lophocolea attenuata* Steph., *L. lacerata* Steph., *L. leptantha* Tayl., *L. microstipula* Steph. and *L. otiphylla*, *Cephalozia trisetosa* Steph., *Schistochila reicheana* and *S. stratosa* Mont., *Lepidozia lævifolia* Tayl. and *L. chordulifera* De Not. and *Jungermannia pigafettoana* Mass., of which only the last occurs in considerable masses.

The ground is rich enough in Musci, but *Hepaticæ* are scarce. A regular carpeting of mosses, composed of loosely woven species, is not uncommonly to be found in places where, for one cause or other, the *Chusquea* grasses are receding. The moss vegetation is likewise rich on the affluents of the main river, especially where they trickle down through stony and well-shaded ground. Of *Hepaticæ* hardly more than two species, and only in extremely rare cases, occur in considerable numbers; namely, *Plagiochila latifrons* Hpe. et Gottsche, and *Chiloscyphus striatellus*, the latter also growing epiphytically on *Hymenophyllaceæ* and *Pogonatum dendroides*.

In the following list of some of the more important *Hepaticæ* and Musci I have included some species which grow on rocks and stones, denoting them with an appended (r) *Hepaticæ: Cryptomitrium tenerum* (Hook.) Aust., *Symphyogyna circinata* N. et M. and *S. hochstetteri* N. et M., *Jamesoniella colorata*, *Tylimanthus fendleri* Steph. and *T. viridis* Mitt., *Plagiochila gayana* Gottsche, *P. longissima* and *P. tristis* Steph. (r), *Lophocolea campanulata* Steph. (r), *L. gottscheæoides* and *L. triseriata* Steph., *Alobiella dusenii* Steph. (r), *Isotachis anceps* (r), *Schisma dura* Steph. (r), *Lepicolea ochroleuca* and *L. quadrilaciniata* (Sull.) (r), *Mastigophora antarctica* Steph. (r), *Schistochila spegazziniana* (Mass.) (r), and *Balantiopsis chilensis*.

Musci: Rigodium toxarion and *Thamnium arbusculans*, both common and massed together, *Brentelia chilensis* Lor., occasionally plentiful and forming mats along brooklets; *Brentelia harotiana* Besch., *B. brachycoma* Besch. and *B. sublongata* Broth. sp. nov., *Rigodium carnosulum* sp. nov. and *R. pseudo-thuidium* sp. nov., *Brachythecium cuspidarioides* sp. nov., *Bartramia magellanica* Aongstr. (r), *Bartramidula exigua* (Sull.) Jaeg., *Dicranum nigricaule* and *D. billardieri*, *Hypopterygium didictyon* and *H. thouinii*, *Acroschisma wilsoni* Hook. fil. et Wils. (r), *Leptotheca spegazziniana* C. Müll. (r), *Rhacomitrium subnigritum* sp. nov. and *R. flavopallidum* sp. nov., *Bryum steffeni* sp. nov., *B. brevigemmatum* sp. nov. and *B. timmiæcaulon* sp. nov., *Leptobryum pyriforme* (Hedw.) Schpr., *Eustichia longirostris* (Brid.) C. Müll. (r), *Hypnodendron krausei*, *Isothecium serpens* sp. nov., *Ditrichum conicum* (Mont.) Par., *Pogonatum dendroides*, *Pseudoleskea fuegiana* Besch., *Catagonium politum* (Hook. fil. and Wils.) Mitt., *Ptychomnium cygnisetum*, *Blindia contecta* C. Müll. (r) and *B. globularis* sp. nov. (r), *Webera cruda* (L.) Schwaegr. and *W. alticaulis* (C. Müll.) Par.,

Barbula robusta (Hook. et Grev.) Brid. (r) and *B. flavido-pilosa* sp. nov. (r), *Pterygophyllum obscurum* (Mont.) Mitt. and *Cladomnium crenato-obtusum* sp. nov. (r).

The vegetation of lichens is not rich, save that in the vicinity of the mouth of the river it reminds one, in some degree, of the abundance of lichens along the beach of the islands, *Stictaceæ*, as usual, being well to the front. The following species are deserving of notice: *Sticta longipes* (Müll. Arg.) Malme, *S. caulescens* and *S. damæcornis* (Sw.) Ach., *Pseudocyphellaria faveolata* (Del.) Malme, var. *cervicornis* (Flot.), *P. intricata* (Del.), *P. wainio*, var. *thouarsii* Del. and *P. physciospora* (Nyl.) Malme. *Nephroma antarcticum*, *Sphærophorus compressus* and *Stereocaulon ramulosum*.

II. THE COMMUNITY OF DECIDUOUS BEECHES.

About forty-five kilometers above the mouth of the Rio Aysen a complete change takes place in the vegetation, the evergreen beeches and their accompanying species rapidly disappearing, and a new community of plants, that of the deciduous beeches, very dissimilar to the preceding, taking their place. Almost suddenly the twilight of the *Chusquea*-grass and dense foliage of the evergreen beeches is succeeded by an open and bright landscape, where the pioneers may cease their now unnecessary work and the road is free in almost every direction, without risk of serious impediment. Here also the ground is covered by a beautiful park-like forest, although quite differently composed and with quite another undergrowth, as compared with the one previously described. Already attractive from its rich vegetation, this new district becomes still more so from the sharp contrast that its community of plants offers to the one which we have now left behind us.

Nature has endowed this region richly, almost profusely. Its vegetation is simply luxuriant and in the park-like forest one wades through grasses and other herbs reaching as high as one's waist, this luxuriance being partly explained by a deep layer of rich humus; a virgin soil that up to the time of our expedition had probably never been trod by human foot.

The park-like forest is comparatively thin and almost exclusively composed of the deciduous beech, *Nothofagus antarctica*, which does not

stand in such dense order of growth as its European cousin, *Fagus sylvatica* L. A solitary specimen of *Nothofagus pumilio* may be occasionally encountered.

The light in these forests is stronger than in the beech forests of Europe, not only by reason of the trees not standing very close together, but also because, as a rule, one or other of their main branches is withered. Evidently, this cannot be due to fire, nor does it appear to be caused by the ravages of parasites in excessive numbers, whether species of *Myzodendron* or parasitical fungi; the reason is unknown.

The bright light prevailing in these forests and the fertility of the soil sufficiently explain their rich undergrowth, so extremely different from that of the beech forests of northern Europe, which also grow on humus. The difference may be illustrated by a few comparisons. Among other features of the beech forests of northern Europe are the following: the undergrowth is very sparse and poor in species, the ground being nearly bare of vegetation and strewn with fallen leaves and involucres; shrubs are wanting, while spring flowers are common, likewise plants with underground stems, not rarely consisting of a creeping rhizome; the great majority of plants are perennial; saprophytic plants occur; mosses and lichens are almost entirely wanting. In nearly all these respects the beech forests of the upper Aysen valley are different. A vegetation of shrubs occurs, though it is but poorly developed; the flora is not particularly rich in species, but the vegetation is dense; the ground is nowhere bare of plants; of spring flowers there are none, except some species of *Berberis* and *Ribes*, which should perhaps be counted as such; most species flower in summer and the beginning of autumn; bulbous and saprophytic plants are wanting; the number of annual and perennial species is about the same as in Europe; mosses do not grow on the ground, but sometimes plentifully on the tree-trunks; the vegetation of lichens, sometimes abundant, consists of only a single species, *Letharia poeppigii* (Nees et Flot), other species being few and rare.

Of plants composing the undergrowth, some are conspicuous by their occurrence in large masses, such as *Galium aparine*, extremely common and forming quite a network on the top of the other vegetation; *Vicia daropskyana*, plentiful; *Mutisia retusa*, sometimes abundant; *Acæna ovalifolia*, common, even abundant here and there; *Osmorhiza berterii*, plentiful; *Calceolaria darwinii*, *Uncinia phleoides* and *Carex filiformis* subsp.

æmatorhyncha f. *gracilis*, plentiful here and there. Of grasses, *Bromus catharticus* and *Elymus albowianus* are predominant.

Subjoined is a list of species composing the undergrowth:

Berberis microphylla Forst.
darwinii Hook.
ilicifolia Linn. fil.
Galium aparine L.
fuegianum Lam.
Vicia doropskyana Phil.
Lathyrus magellanicus Lam.
Mutisia retusa Remy.
decurrens Cav.
Solidago chilensis Meyen.
Leuceria sp.
Adenocaulon chilense Less.
Cerastium arvense L.
Stellaria cuspidata Willd.
Fragaria chilensis Ehrh.
Acæna ovalifolia Ruiz et Pav.
Osmorhiza berterii DC.
Ribes cucullatum Hook. et Arn.
sp. (probably *R. magellanicum* Poir.).
Geranium magellanicum Hook. fil.
Geum magellanicum Comm.
Calceolaria darwinii Benth.
Uncinia phleoides Pers.
Carex filiformis, subsp. *æmatorhyncha*, f. *gracilis*.
Alopecurus alpinus Sm.
Trisetum subspicatum Beauv.
Deschampsia flexuosa (L.) Trin.
Bromus catharticus Mol.
Elymus albowianus Kurtz.
Blechnum pinna-marina (Poir.).
Polystichum elegans Remy.

On the trunks of the trees are only a few species of mosses generally massed together, namely, *Zygodon gracillimus* and *Z. curvicaulis*, *Brachythecium sericeo-nitens* sp. nov. and *Barbula flagellaris*, in addition to a single representative of the *Hepaticæ*, *Lophocolea cucullistipula*. I have already referred to the lichens.

The space occupied by the community of deciduous beeches is not altogether continuous, because, as already mentioned, there are small steppes within the forest, of one or two kilometers in extent, which are found even very far to the west. The boundary between these steppes and the encircling forest is, as a rule, sharply defined, but sometimes there is an intermediate belt of very dense thickets of *Berberis microphylla*. The fact that the beech-nuts never spread very far from the mother-tree might account for this well-defined boundary between the forest and the steppe.

III. THE STEPPE DISTRICT.

1. The Small Steppes.

The vegetation of the large steppe district to the eastward of the Aysen valley I know only through my exploration of the small isolated steppes within the forest. That, on the whole, their vegetation gives a correct idea

of the steppe proper, I infer from the fact that nearly all of the species composing it are also found in the district of Nahuel-huapi, which is genuine steppe land, large and unbroken; though the flora of these smaller steppes necessarily shows considerably fewer species than occur farther eastward. By including those species also which are found on the steppe-like slopes of the surrounding mountain heights, at an altitude of 700 to 1000 meters above the sea, this disproportion is somewhat reduced. It is a matter of course that the smaller steppes, being entirely level and with a perfectly homogeneous soil, cannot furnish so many species as the wide Patagonian steppe, with its diversity of soil and surface, and offering far more favorable conditions for the growth of a rich and varied flora.

On the small steppes now in question grasses predominate, their foremost representative being *Festuca gracillima*, which grows in small tufts. Shrubs are remarkably few and scarce. Of tuberous plants there is only one, belonging to the the family of the Orchids, which was found in a withered state and was therefore not determinable. The number of annual and perennial species is about the same. The vegetation is scanty.

List of Species.

Berberis microphylla Forst.
empetrifolia Lam.
Ribes cucullatum Hook. et Arn.
Baccharis magellanica (Lam.) Pers.
Erigeron sordidus Gill.
Solidago chilensis Less.
Hypochœris poeppigii (DC.).
Madia sativa Mol.
Senecio danyausii Hombr. et Jacq.
argenteus Kze.
Perezia linearis Less.
Cerastium arvense L.
Geranium magellanicum Hook. fil.
Acæna multifida Hook. fil.
splendens Hook. et Arn.
Fragaria chiloensis (L.) Ehrh.
Anemone multifida Poir.
Collomia gracilis Dougl.
Thlaspi magellanicum Comm.
Armeria chilensis Boiss. var.
magellanica Boiss.
Quinchamalium sp.
Loasa volubilis Juss.
Sisyrinchium chilense Hook.
Susarium segethi Phil.
Luzula racemosa Desv.
Carex gayana Desv. var. *densa* Kükn.
Alopecurus alpinus Sm.
Phleum alpinum L.
Deschampsia flexuosa (L.) Trin.
Agrostis montevidensis Spr. var. *submutica* Doell.
Festuca gracillima Hook. fil.
Trisetum subspicatum Beauv.
Poa fuegiana (Hook. fil.) Hack.

One or two species of *Orthotrichum* and one of *Usnea*, somewhat resembling *U. barbata*, are found on the older *Berberis* shrubs, but apart from these, there is no vegetation of mosses or lichens in these small steppes.

2. The Mountain Flora of the Upper Aysen Valley.

A brief account of the vegetation of the mountains surrounding the rather wide upper valley of the Aysen should not be omitted in this connection, although my knowledge of it is not very comprehensive, being founded only on my observations during a single ascent to the higher and bare parts of one of these mountains.

Their flora is rather diversified and their sides up to an altitude of 700 meters are covered with extremely dense thickets and park-like forest. Above the 700-meter-line the vegetation becomes more like that of the steppe, having much in common with the flora of the treeless areas in the valley and interspersed with small groves of *Nothofagus pumilio* up to an elevation of 1000 meters. This tree extends upward to an altitude of 1300 meters, continually decreasing in size, and becoming a mere bush and growing in low thickets near the upper limit of its range. It is accompanied by a vegetation which is very much poorer in species than that of the lower and steppe-like slopes, and differently composed. Above the 1300-meter-line the vegetation is extremely thin, with very few species, and at 1400 meters every trace of plant-life disappears.

The excessively dense and almost impassable thickets of the lower slopes are made up of the following species: *Berberis microphylla* and *B. darwinii*, *Ribes* sp. (presumably *R. magellanicum* and *R. cucullatum*), *Discaria discolor*, *Pernettya mucronata*, *Colletia spinosa*, *Rhacoma disticha*, *Escallonia rubra*, with a sprinkling of herbaceous plants, such as *Viola maculata*, *Vicia daropskyana*, *Elymus albowianus*, *Deschampsia flexuosa* and *Mutisia retusa*, the last named of which is often plentiful, the others being very scarce.

Here and there small beech groves are interposed between the thickets. At a height of from 500 to 600 meters I met with one grove that quite unexpectedly turned out to be composed of *Nothofagus betuloides*, which species I could hardly have believed to exist in these dry areas. The undergrowth of the grove was made up exclusively of *Rhacoma disticha*.

During my ascent the last park-like forest was found at an altitude of 700 meters. It was as vigorous as the forests of the valley and fully typical, although *Nothofagus pumilio* preponderated. The undergrowth was the same as in the valley and, in addition, the following three species were found: *Embothrium coccineum*, *Rhacoma disticha* and *Cystopteris fragilis*.

The flora of the steppe-like slopes above is partly composed of the same species as I have already stated to occur in the small steppes of the valley. But as, in addition, it shows many species which I did not find in the latter, I subjoin a complete list of species. It is as follows:

Baccharis magellanica (Lam.) Pers.
Chiliotrichium diffusum (Forst.).
Pernettya mucronata (Linn. fil.) Gaud.
Escallonia rubra Pers.
Senecio argenteus Kze.
chilensis Less.
andersoni Hook. fil.
Erigeron sordidus Gill.
Hypochœris poeppigii (DC.).
arenaria Gaud.
Perezia linearis Less.
Gnaphalium serpyllifolium Remy.
Hieracium chilense Less.
Saxifraga cordillerarum Presl. var. *magellanica* (Poir).
Mulinum spinosum (Pers.).
Daucus australis Poepp.
Anemone multifida Poir.
Acæna multifida Hook. fil.
elegans Phil.
Fragaria chilensis (L.) Ehrh.
Empetrum rubrum Vahl.
Melandrium magellanicum (Lam.) Fenzl.
Oxalis laciniata Cav.
Viola maculata Cav.
Discaria discolor (Hook.).
Rhacoma disticha (Hook.) fil.
Berberis microphylla Forst.
Wendtia reynoldsi Endl.
Armeria chilensis Boiss. var. *magellanica* Boiss.
Cerastium arvense L.
Lathyrus magellanicus Lam.
Phacelia circinata Jacq.
Calceolaria biflora Lam.
Valeriana carnosa Sm.
Loasa volubilis Juss.
Thlaspi magellanicum Comm.
Sisyrinchium chilense Hook.
Luzula racemosa Desv.
Phleum alpinum L.
Trisetum subspicatum Beauv.
Poa fuegiana (Hook. fil.) Hack.
Deschampsia flexuosa (L.) Trin.
Festuca gracillima Hook. fil.
Aira montividensis Spr. var. *submutica* Doell.
Cortaderia pilosa (d'Urv.).

In some places these steppe-like slopes are studded with small groves, consisting exclusively of *Nothofagus pumilio*, *N. antarctica* having now disappeared. The ground beneath is sometimes fairly well covered with mosses, the following species of which are conspicuous: *Brachythecium paradoxum* (Hook. fil. et Wils.) Besch., *B. morenoi* C. Müll., *Bryum hamatum* sp nov., *Acrocladium auriculatum* (Mon.) Mitt., *Campylopus laniger* Besch., *Plagiothecium lepto-plumosum* Dusén and *Catagonium politum* (Hook. fil. et Wils.) E. Müll.

Even at an altitude of 800 to 900 meters *Nothofagus pumilio* is only a low tree, the lower branches of which do not permit one to pass beneath them. The greater the altitude at which it is found, the shorter it is, forming at the upper limit of its range (1300 meters above sea-level) a very stunted forest of dwarfed trees, the horizontal branches of which are

intertwined with one another. *Nothofagus pumilio* therefore differs in no way as to habit from *N. antarctica*, the dwarfed growth of which at high altitudes I have already described.

At this height *Nothofagus pumilio* is accompanied by a very scanty vegetation which is quite different from that of the steppe, all grasses except *Poa fuegiana* having disappeared. Large areas are entirely bare of plants, and boisterous winds often make a clean sweep. Only on the leeward (here the eastern) side of the thickets does the sand remain in patches, and only here can the more delicate species hold their own in their severe struggle for existence. On such a patch of sand I noticed the following species, growing quite closely together when near the thicket, but elsewhere scattered at rather wide intervals.

Ribes cucullatum Hook. et Arn.
Pernettya mucronata (Linn. fil.) Gaud.
leucocarpa DC.
Berberis empetrifolia Lam.
Empetrum rubrum Vahl.
Rubus geoides Sm.
Chiliotrichium diffusum (Forst.).
Senecio chilensis Less.
triodon Phil.
Hypochæris arenaria Gaud.
Perezia pedicularifolia Less.
Perezia linearis Less.
Leuceria salina (Remy).
Acæna pearcei Phil.
leptacantha Phil.
Azorella lycopodioides Gaud.
Cerastium arvense L.
Thlaspi magellanicum Comm.
Armeria chilensis Boiss. var. *magellanica* Boiss.
Valeriana foncki Phil.
Luzula racemosa Desv.
Poa fuegiana (Hook. fil.) Hack.

Still higher up the vegetation is extremely poor and sparse. Up to an altitude of 1300 meters I saw the few following species:

Chiliotrichium diffusum (Forst.).
Nassauvia serpens d'Urv.
Senecio purpuratus Phil.
chilensis Less.
Acæna leptacantha Phil.
Draba magellanica Lam.
Armeria chilensis Boiss. var. *magellanica* Boiss.
Oxalis laciniata Cav.
Luzula racemosa Desv.
Poa fuegiana (Hook. fil.) Hack.

At an elevation of 1400 meters I found only one plant, a lichen, *Neuropogon trachycarpus* Stirl. Above that height the slopes were entirely denuded of vegetation.

The flora of the Alpine region of the western Patagonian Cordillera is, on the whole, still unknown. Omitting the Alpine and marine floras, the western Patagonian vegetation, taken as a whole, may be said to consist of only the three communities of plants which I have attempted in some measure to describe.

The community of evergreen beeches occupies a narrow, but very long strip of land on the western side of the Cordillera. In the south it expands over the western and southwestern portions of the Magellan district, reaching its southern limit only at Cape Horn. Northward, it extends through the whole of southern Chili, its total range north and south comprising no less than 18 degrees of latitude, equal to about 2000 kilometers, or 1200 English miles.

The space occupied by the community of deciduous beeches on the western side of the Cordillera is far less extensive. At its southernmost point, on or near the Straits of Magellan, it is not quite homogeneous, but is intermingled with some intruders from the community of evergreen beeches, which here unexpectedly extend far eastward. In the southern part of Fuegia also, at least along the eastern section of the Beagle Channel, both of these communities are intermingled, though even here, between the Rio Grande and the large firth-like lake, Lago Fagnano, the former is quite typical. Farther north and already in northern Patagonia, the character of this community of plants is somewhat modified by the accession of new elements, the most important being *Libocedrus chilensis* Endl., though to what extent, I was not in a position to determine.

The steppe vegetation, on the whole, is very uniform throughout the entire length of the area which it occupies. In northern Patagonia this area is evidently very narrow, but towards the south it expands more and more, extending in Fuegia, and probably in southern Patagonia also, quite to the Atlantic coast. Many species range over the whole of the Patagonian steppe, extending also to the Fuegian. To give one instance only, *Festuca gracillima*, which is so characteristic of the small steppes in the upper Aysen valley, is quite as much at home in large sections of the Fuegian steppe and likewise in the Patagonian, as in the district around Lago Nahuel-huapi.

In the foregoing account of the vegetation of west Patagonia I have occupied myself only with the three plant-communities mentioned. This is not because there are no others represented here, but only because these others are of very secondary importance and in no way comparable to the three dominant plant communities described.

ERRATA AND EMENDATIONS IN PART I.

Page 5, footnote 1, line 1, 2, for Aufenthalt read Aufenthalts.

Page 7, line 11, for *endivæfolius* read *endiviæfolius*.

Page 7, line 23, for *Senecio smithii* DC., read *Senecio acanthifolius* Hombr. et Jacq.

Page 7, line 25, for *Marsipospermum* read *Marsippospermum* (the same also in p. 10, line 5, and p. 22, line 9 from foot).

Page 8, line 23, for *Fuchsia coccinea* Ait. read *Fuchsia magellanica* Lam.

Page 8, line 28, for (Mant.) read (Mont.).

Page 8, line 29, for *orymæa* read *orygmæa* (bis).

Page 9, line 14, for *betuloides* read *antarctica*.

Page 10, line 5, for *bifurcatus* read *trifurcatus*.

Page 12, line 22, for *Dacostea* read *Decostea* (the same also at p. 14, line 2; p. 15, line 23; p. 20, line 3 from foot).

Page 13, line 7, for *Brentelia* read *Breutelia*.

Page 13, line 12, for *anomada* read *anomoda*.

Page 14, line 12, for *P. urvillei* read subsp. *urvillei*.

Page 15, line 9, *Myrtus ugni*, the author uses *Ugni Molinæ*.

Page 19, footnote, for von Bronsart Schellendorf read Bronsart von Schellendorf.

Page 20, line 4 from foot, for *Cynoctomum* read *Cynoctonum*.

Page 21, line 17, for *magni* read *maqui*; the same 3 lines from foot.

Page 22, line 19 of 2d column, for *lutens* read *luteus*.

Page 22, line 22 of 2d column, for Phil. read DC.

Page 22, line 23 of 2d column, for (Gaerth.) read (Gaertn.).

Page 22, line 30 of 2d column, for Hanskn. read Hauskn.

Page 22, line 8 from foot, for *daropskyana* read *darapskyana* (similarly for p. 27, line 3 from foot; p. 28, line 9; p. 30, line 13 from foot.

Page 23, line 3 of 1st column, for Hook. read Hack.

Page 24, line 12, for *Barbula crispatula* read *Calyptrogon crispatulus* (C. Müll.) Broth.

Page 24, line 6 from foot, for *Lophozea* read *Lophozia*.

Page 25, lines 23, 24, 25, for *Brentelia* read *Breutelia*; for *harotiana* read *hariotiana*, and for *sublongata* read *subelongata*.

Page 25, line 3 from foot, for Mitt. read C. Müll.

Page 26, line 10, for *P. wainio* read Wainio.

Page 29, line 6 from foot, for *chiloensis* read *chilensis*.

Page 31, line 26, 2d column, for *montividensis* read *montevidensis*.

Page 31, line 27, 2d column, after d'Urv. add Hack.

Page 31, line 8 from foot, for (Mon.) read (Mont.).

Page 31, line 6 from foot, for E. Müll. read C. Müll.

Page 32, line 7 from foot, for Stirl. read Stirt.

(N. B. It should be observed that it was impracticable for the author to revise the proofs.—Ed.)

PRIMEVAL FOREST IN GUIATECOS ISLAND.

Longitude West from Greenwich
74°
70°
66
40
44
Confluencia
Fort Roca
Chilfoco
R. Negro
Choele-Choel
R. Colorado
TERRITORY OF NEUQUEN
Valdivia
R. Collonueura
R. Limay
Chacabuco
L. Nahuel Huapi
R. Negro
Carmen de Patagones
TERRITORY OF RIO NEGRO
San Antonio
Viedma
Dos Hermanos
Pt. Villarino
GOLFO DE SAN MATIAS
Pta. Norte
Pto. San Jose
PENINSULA VALDEZ
Golfo Nuevo
Pta. Delgada
Puerto Madryn
Trelew
Gaiman
RAWSON
R. Chubut
R. Chubut
TERRITORY OF CHUBUT
R. Corren-Leufu
L. General Paz
R. Futaleufu
HUAFO I.
GUAITECA I.
Golfo de Ancud
I. CHILOE
GOLFO DE CORCOVADO
Canal Moraleda
I. MAGDALENA
CHONOS ARCHIP.
C. Raso
C. San Jose
Pta. Fulgencia
Camarones Bay
C. Dos Bahias
I. LEONES
R. Senger
R. Senger
L. Colhue
L. Musters
GOLFO DE SAN JORGE
R. Fenix
Mt. San Valentin 3030 M.
PEN. DE TAYTAO
L. Buenos Aires
L. Soler
Rio Deseado
C. Tres Puntas
TERRITORY
ANDES
PACIFIC OCEAN

PATAGONIA
AND
TIERRA DEL FUEGO
After MORENO, NORDENSKJÖLD, and HATCHER.
Scale of Kilometers.
0 30 60 90 120 150
ENGRAVED BY AMERICAN BANK NOTE COMPANY, NEW YORK, U.S.A.
Longitude West 70° from Greenwich
74°
66°
48°
52°
56°
Mt. Las Heras
L. Belgrano
Mt. Belgrano
L. Nansen
Bald Mt.
Crystal L.
Puerto Deseado
R. Seco or R. Salado
St. Dennis
R. De Bajos
SANTA CRUZ
SHELL GAP
L. St. Martin
Sierra Oveja
Sierra Ventana
North Mt.
Fortaleza
Oven Point
Pto. San Julian
L. Cardiel
L. Tar
South Mt.
Mt. Fitz Roy
2187 M.
Dry L.
Corpen Aike
Beehive Springs
Darwin Station
Salt Lakes
R. Shehuen or R. Chalia
Beagle Point
Pescadores
Las Salinas
I. PAYOR
STA. CRUZ
L. Viedma
Oti-aiken
Castle Hill
Carr-aiken
L. Argentino
R. Santa Cruz
Direction Hill
Mt. of Observation
CON CAON
Mt. Viscachas
L. Riea
Mt. Stokes
L. Sarmiento
R. Coy
Coy Inlet
Corriken Aike
L. Marazilla
Killik Aike
C. Fairweather
Puerto Gallegos
GALLEGOS
Laguna Leona
W & R Rand
Los Frailes
R. Gallegos
Guer Aike
Palli Aike
L. Palmacedo
L. Pinto
Mt. Aymond
Onshi Aike
C. Virgenes
Pta. Dungeness
Magellan Strait
Pta. Anegada
Pta Catalina
C. Espiritu Santo
Springhill
Posada de la Reina
Cabeza del Mar
Skyring Water
El Paramo
Pta. de Arenas
Bahia San Sebastian
C. San Sebastian
KING WILLIAMS LAND
ELIZABETH I.
Otway Water
PTA. ARENAS
C. Pillar
C. Deseado
Churucca
Vaulegna
Pto. Angosto
C. JACQUE
DESOLATION I.
Pt. Famine
Useless Bay
C. Valentin
BRUNSWICK PENINSULA
C. Sunday
Mission Sta.
Cabo Penas
SIERRA DE CARMEN SYLLA
Pantano
Porvenir
STA. INES I.
TIERRA DEL FUEGO
C. Froward
CLARENCE I.
GRAFTON IS.
Mt. Sarmiento
Mt. Hope
L. Solier
Lago Fagnano
Darwin Mt.
Lapataia
Ushuaia
Beagle Ch.
Tres Hermanos
C. San Diego
Le Maire Str.
C. St. Anthony
Pto. San Juan
STAATEN I.
BRECKNOCK PEN.
CAMDEN I.
STEWART I.
LONDONDERRY I.
NAVARIN I.
PICTON I.
HOSTE I.
Nassau B.
Packsaddle B
Orange B.
WOLLASTON IS.
I. HERMITE
DECEIT I.
Cape Horn
CAPE HORN CURRENT
Aguirre B.
WEST MAGELLAN TO HAWAII 11,000 KM.
WEST MAGELLAN TO NEW ZEALAND 7,700 KM.
MAGELLAN TO KERGUELAN 8,200 KILOMETERS
TO TASMANIA (BY KERGUELAN) 14,000 KILOMETERS
MAGELLAN TO TRISTAN 4,860 KILOMETERS
FALKLAND ISLANDS 540 KILOMETERS
PTA. DUNGENESS TO CAPE-TOWN 7,000 KILOMETERS
WELLINGTON I.
HANOVER I.
DK. OF YORK I.
M. DE DIOS ARCHIP.
QUEEN ADELAIDE ARCHIPELAGO
Trinidad Channel
Wilson Str.
Innocente Can.
Esperanza Inlet
Otway
Magellan
CAMPAÑA I.
WAGER I.
BYRON I.
Mayer Basin
R. Mayer
R. La Leona
L. Belgrano
Canal Smyth
Canal Concepcion
Otway
Skyring Water
Gente Grande B.
Fortescue B.
Gregory Bay
Admiralty Sound
Lapataia B.
Ushuaia B.
Beagle Ch.
Aguirre B.
Jordan Sd.
Cockburn Can.
Magdalen Sd.
Barbara Sd.
Darwin Sd.
Nassau B.
Packsaddle B
Orange B.
Cape Horn
CAPE HORN CURRENT

HEPATICÆ COLLECTED IN SOUTHERN PATAGONIA.

BY

ALEXANDER W. EVANS,

YALE UNIVERSITY.

(PLATES IV, V, VI.)

THE territory of Patagonia, and particularly the regions neighboring the Straits of Magellan, have several times been visited by scientific expeditions. Most of these have made collections of Patagonian plants and have included the hepaticæ among them, either incidentally or systematically. Our knowledge of the hepatic flora of this remote country is, therefore, sufficient to give us some idea of its exceeding richness and variety. Although a few of the most conspicuous species were gathered in the first years of the present century and even earlier, the real foundations of our knowledge are based on the collections made during the Antarctic voyage of the British ships *Erebus* and *Terror*, in the years 1839–43. These important collections were studied by Sir Joseph D. Hooker and Dr. Thomas Taylor, and their preliminary account[1] of the species found was later amplified into a fuller description[2] accompanied by numerous colored figures.

Passing over several smaller gatherings, attention may further be called to three larger collections, which have been made and described within recent years. The first of these collections was that of Dr. Spegazzini, which was made in 1882 and included 103 species, most of which came

[1] Hepaticæ Antarcticæ; being characters and brief descriptions of the Hepaticæ discovered in the southern circumpolar regions during the voyage of H. M. discovery ships *Erebus* and *Terror*. Lond. Jour. of Bot. **3**: 366–400, 454–481. 1844.

[2] Flora Antarctica, **2**: 423–446. *pl. 156–161.* 1847.

from Fuegia. The determinations were by Professor Massalongo, of Ferrara, who published an illustrated account[1] of the species collected, describing 27 as new. The second collection was made under the direction of the French "Mission Scientifique du Cap Horn," and was studied by M. Bescherelle, of Paris, and Professor Massalongo. A preliminary paper[2] by these writers described the new species and varieties, and their memoir,[3] published a little later, gave a complete enumeration of the plants in the collection with illustrations of many interesting forms. In their list, which includes a number of species found by Dr. Savatier on the western coast of Patagonia, we find 88 species, of which 12 are considered new. The third collection was made by Dr. Naumann during the voyage of the German ship, the *Gazelle*.

Although collected in the years 1875 and 1876, the account of these hepaticæ was not published until 1890. They were first studied by Dr. Gottsche, of Altona, who made drawings of the various species collected. He also began but did not finish the work of description, and his notes were afterwards revised and completed by Dr. Schiffner, of Prague, who made use of many of Gottsche's figures in the published account[4] of the collection. Sixty-nine species from the straits of Magellan are included in this enumeration, and, of these, 16 are described as new.

The present report is based on a collection made by Mr. John B. Hatcher in the years 1896 and 1897, while engaged in geological field work for Princeton University. Nearly all the plants were found either at Lapataia on the southern coast of Fuegia or at Villarino Bay, about a day's journey to the westward of Lapataia, both stations being situated on the Beagle Channel. A very few species came from the Cordilleras of Patagonia. The collection, which numbers 53 species, includes few novelties, but is of interest in adding to our knowledge of certain rare and incompletely known forms.

In the preparation of this paper I am especially indebted to Dr. B. L. Robinson for allowing me access to the Taylor Herbarium, to Herr

[1] Epatiche della Terra del Fuoco raccolte nell'anno 1882 dal Dott. C. Spegazzini. Nuovo Giorn. Bot. Ital. **17**: 201–277. *pl. 12–28.* 1885.

[2] Hepaticæ novæ americanæ-australes. Bull. de la Soc. Linn. 626–632, 637–640. 1886.

[3] Hépatiques récoltées par la Mission francaise du Cap Horn au 1882 et 1883. Comptes rendus de la Mission Scientifique du Cap Horn, **5**: 201–252. *pl. 1–5.* 1889.

[4] Lebermoose (Hepaticæ) gesammelt auf der Reise S. M. S. Gazelle vorzüglich in der Magellen-Strasse, auf der Malayischen Inseln und Kerguelen-Land, 1–48. *pl. 1–8.* 1890.

Stephani for helpful notes, drawings and specimens, and to Prof. Nathorst for the loan of two of Ångström's types. Other correspondents who have given me assistance will be mentioned under particular species.

1. ADELOCOLEA UNCIFORMIS (Hook. f. & Tayl.).

Jungermannia unciformis Hook. f. & Tayl. Lond. Jour. Bot. **3**: 457. 1844.

Plagiochila unciformis Hook. f. & Tayl. in G. L. & N. Syn. Hep. 653. 1847.

Adelanthus unciformis Spruce, Jour. Bot. **5**: 200. 1876.

Plagiochila sphalera Hook. f. & Tayl. in G. L. & N. Syn. Hep. 653. 1847.

Jungermannia haliotiphylla De Not. Mem. Acc. Tor. II., **16**: 217. *f. 5.* 1857.

Adelanthus lindenbergianus (Lehm.) Mitt. Jour. Linn. Soc. **7**: 244. 1864.

Lapataia. Punta Arenas (Dusén).

As Mitten[1] has already pointed out, there is a genus *Adelanthus* older than his own. It is the *Adelanthus* of Endlicher, which is now regarded as a synonym of *Pyrenacantha* Wight. Mitten suggests that the name "*Adelocolea*" be substituted for his *Adelanthus* but makes the change in only one species, viz., *Adelocolea decipiens* (Hook.) Mitt.

2. ANDROCRYPHIA PORPHYRORRHIZA Nees in G. L. & N. Syn. Hep. 470. 1846.

Jungermannia porphyrorrhiza Nees in Mart. Fl. Bras. **1**[1]: 343. 1833.

Noteroclada porphyrorrhiza Mitt. Bot. of Kerguelen Island: Transit of Venus Exped. 37. 1874.

Jungermannia confluens Hook. f. & Tayl. Lond. Journ. Bot. **3**: 478. 1844.

Androcryphia confluens Nees in G. L. & N. Syn. Hep. 471. 1846.

Villarino Bay. (By Dusén at Punta Arenas and E. Fuegia.)

In Hooker and Taylor's Hepaticæ Antarcticæ, the authors did not divide the old genus *Jungermannia* into distinct genera, but simply into subgenera and the name *Noteroclada* was given to one of these. Two years afterwards, in the Synopsis Hepaticarum, Nees von Esenbeck raised the group to generic rank, but, instead of retaining for it the name *Notero-*

[1] Challenger Exped., Bot. **1**[2]: 106. 1884.

clada, substituted the name *Androcryphia*. The latter, therefore, is the oldest for the group as a genus and ought to be retained.

3. ANEURA CALVA Schiffn. & Gottsche, Lebermoose der Forschungsreise S. M. S. "Gazelle," 42. *pl. 8. f. 16.* 1890.

Fuegia.

4. ANEURA CRISPA (Schiffn. & Gottsche) Steph. Hedwigia, **32**: 137. 1893.

Pseudoneura crispa Schiffn. & Gottsche, Lebermoose der Forschungsreise S. M. S. "Gazelle," 41. *pl. 8. f. 14, 15.* 1890.

Fuegia.

The specimens agree with a part of the type-material, kindly sent me by Professor Schiffner. (W. Magellan, Dusén.)

5. ANEURA FUEGIENSIS (Massal.) Evans, Contr. U. S. Nat. Herb. **1**: 142. 1892.

Riccardia fuegiensis Massal. Nuovo Gior. Bot. Ital. **17**: 255. *pl. 26. f. 34.* 1885.

Lapataia.

6. ANEURA PREHENSILIS (Hook. f. & Tayl.). Non Mitt. in Hook. f. Handb. N. Zeal. Fl. 543. 1867.

Jungermannia prehensilis Hook. f. & Tayl. Lond. Jour. Bot. **3**: 480. 1844.

Metzgeria prehensilis Hook. f. & Tayl. in G. L. & N. Syn. Hep. 505. 1846.

Acrostolia prehensilis Trevis. Mem. reale Ist. Lomb. di Sci. e Lett. III. **4**: 431. 1877.

Riccardia prehensilis Massal. Nuovo Gior. Bot. Ital. **17**: 255. 1885.

Aneura savatieri Steph. Hedwigia, **32**: 26. 1893.

Villarino Bay. (W. Magellan, Dusén.)

There has been so much confusion regarding this characteristic plant of southern Patagonia that it seems wise to give a brief review of the literature concerning it and to emphasize again its most important peculiarities. The original description of *Jungermannia prehensilis* (like all in Hooker

and Taylor's paper) consists of two parts—a diagnosis in Latin, and a somewhat fuller account in English with comparative remarks. In the Synopsis Hepaticarum we find the diagnosis simply repeated and the English account translated into Latin, so that this description contains nothing new and is essentially like the original. In the Flora Antarctica again, what is practically the same description reappears, but this time is supplemented by a figure of the plant with slightly enlarged details. This original description is, of course, incomplete and the part which applies to the vegetative characters of the plant, particularly so. The following extracts include all the points brought forward about the thallus: "Fronde laxe cæspitosa erecta incurva alata; lobis alternis secundis pinnatis, pinnulis planis linearibus crassinerviis;" "Fronds loosely tufted, with broad hooked tips, the stem flat, brown, pubescent, the pinnules are smoother and of a pale olive green." The plant is compared with *Jungermannia eriocaula* Hook., which is said to be darker green and to have a tripinnate frond with narrower pinnules. Only one station is given, Hermite Island, Cape Horn, and no others are mentioned either in the Synopsis or in the Flora Antarctica.

In the Flora Novæ Zelandiæ, Mitten[1] applies the name *Sarcomitrium prehensile* (changed to *Aneura prehensilis* in the Handbook) to a plant with *smooth* epidermis, and apparently considers it identical with the Fuegian species. With the exception of this character, his description does indeed agree very closely with that of Hooker and Taylor. Massalongo, on the other hand, says of his *Riccardia prehensilis:* "Cellulæ superficiales thalli in appendicem mamillæformem pulcherrime prominent," and Schiffner calls attention to the same peculiarity. Still more recently Stephani, basing his opinion on New Zealand specimens, of *Aneura prehensilis* presumably determined by Mitten, describes a Patagonian plant as *Aneura savatieri* n. sp. and names as his type some of the material referred by Bescherelle and Massalongo to *Riccardia prehensilis.* His description is very clear, the account of the epidermis being as follows: "Cellulæ . . . corticales depresso-imbricatulæ, *i. e.*, apex cellulæ papulosæ supra cellulam proximam parum protractus; margo ubique hyalino subcrenulato." He remarks further: "*Aneura prehensilis* (ex insula N. Zelandia) multo robustior est, epidermide *plano-cellulosa.*"

[1] Op. cit. **2**: 167. 1855.

In view of these conflicting opinions, I have consulted Taylor's original specimens of *Jungermannia prehensilis* from Hermite Island. They are remarkably free from admixture and show the peculiar papillose epidermis described above, indicating that the Patagonian plant is to be looked upon as the true *Aneura prehensilis* (Hook. f. & Tayl.). The New Zealand plant with the smooth epidermis is probably an unnamed species.

The papilliform epidermal cells of *Aneura prehensilis* are somewhat variable in their distribution; on some stems they occur on both surfaces, on others only on the antical surface, while on the pinnules they are scattered and sometimes few in number. A robust rachis is about fifteen cells thick, but its cells are unlike those found in most members of the genus; on the outside there are one or two layers of rather thin-walled cells (including the epidermis) and just inside these are two or three layers of cells with very thick brown walls, the thickening being deposited unequally and leaving irregular cell-cavities; the interior is filled with cells having slightly thickened pale walls. These different kinds of cells do not vary markedly in size.

The nearest ally of *Aneura prehensilis* is the more robust *A. eriocaula* of New Zealand. In this species the rachis, as described by Leitgeb,[1] is essentially like that of the Patagonian plant. The epidermis shows papilliform cells, but the papillæ, instead of being appressed, stand out from the rachis at right angles and give it a hirsute appearance.

7. ANEURA SPEGAZZINIANA (Massal.) Steph. Hedwigia, **32**: 138. 1893.
Riccardia spegazziniana Massal. Nuovo Gior. Bot. Ital. **17**: 254. *pl. 25. f. 32.* 1885.
Fuegia. (W. Magellan, Dusén.)

8. ANTHOCEROS ENDIVIÆFOLIUS Mont. Voy. au Pôle Sud. Bot. Crypt. **1**: 211. 1845.
Lapataia. (Punta Arenas, and W. Magell. Savatier.)

The plants referred to this species agree closely with the detailed description of Massalongo[2] as well as with the more meager original description of Montagne. In the Taylor Herbarium, there is an *Anthoceros* from Cape Horn, labeled *A. punctatus* which belongs here, and,

[1] Unters. über die Leberm. **3**: 49. 1877.
[2] Nuovo Gior. Bot. Ital. **17**: 258. 1885.

judging from the description, *A. Jamesonii* Tayl.[1] is also to be considered a synonym.

9. BLEPHARIDOPHYLLUM DENSIFOLIUM (Hook.) Ångstr. Öfversigt af Kongl. Vetensk.-Akad. Förhand. **29**, Häft 5: 151. 1874.

Jungermannia densifolia Hook. Musc. Exot. *pl. 36.* 1818.
Scapania densifolia Nees in G. L. & N. Syn. Hep. 72. 1844.
Diplophyllum densifolium Mitt. Jour. Linn. Soc. **15**: 69. 1875.
Martinellia densifolia Trev. Mem. reale Ist. Lomb. di Sci. e Lett. III. **4**: 411. 1877.

Villarino Bay. (By Savatier in Magell. St.)

A very variable species, including *Jungermannia vertebralis* Hook. f. & Tayl., *J. chloroleuca* Hook. f. & Tayl. and *J. pycnophylla* De Not.

10. BLEPHAROSTOMA PILOSUM Evans, Torrey Bulletin, 25: 413. 1898.

Pl. IV, Figs. 1–6.

Sterile: densely cæpitose, brownish-green; stems erect, simple or with a few lateral branches, sparingly or not at all radiculose, the rhizoids, when present, coming from the basal cells of the underleaves; leaves and underleaves similar, transversely inserted, concave, broadly orbicular-quadrate in general outline, deeply 4-parted (about $\frac{4}{5}$), the segments lanceolate, 4–7 cells wide at base, tapering into capillary points (each composed of a single row of 5 or more cells), and bearing on their margins 5–8 pairs of opposite widely divaricate capillary teeth, becoming successively longer toward the base; upper teeth composed of a single row of cells, lower teeth strongly deflexed, often 2 cells wide in the lower part and giving off a pair or two of tertiary teeth, the external basal teeth of the outer segments much larger than the others and making the leaves appear 6-parted; undivided basal part of the leaves about 4 cells across: leaves subtending branches similar to the others but only 2-parted (though often apparently 4-parted from the large size of the external basal teeth of the segments): leaf cells oblong, rather thick-walled but without trigones; cuticle often indistinctly and minutely verruculose-striate, especially toward the base of the leaves.

[1] Fl. N. Zeal. **2**: 171. 1855.

Stems 1–2 cm. long, 0.2 mm. wide; leaves 0.85 mm. long and wide, leaf cells averaging 46 μ long, 14 μ wide.

Villarino Bay.

The leaves of the present species are so copiously and finely dissected that the plant remains one at first glance of a *Trichocolea*, but the scanty branching, the dark color and the occasional rhizoids would seem to remove it from that genus. The somewhat problematical *T. polyacantha* (Hook. f. & Tayl.) from New Zealand might, nevertheless, seem from the published descriptions and figures[1] to be identical with our species, but a study of the type material in the Taylor Herbarium shows conclusively that this curious plant is distinct not only from *Blepharostoma pilosum* but also from *B. quadripartitum* (Hook.) Trevis., of which Schiffner[2] has considered it a possible synomym. The New Zealand species is distinguished at once by the numerous paraphylla which clothe the stem and give it a hirsute appearance; they are minute structures, composed of only 2–4 cells and are either simple or forked, their cells, like those of the leaves, being minutely verruculose. Whether the plant is really a *Trichocolea* or not can hardly be settled without a larger supply of material, as the true nature of the involucre cannot be made out without dissection.

In the remarks which supplement Mr. Pearson's description of *Blepharostoma palmatum* Lindb.,[3] a statement is made which would seem to indicate that *B. pilosum* (or some closely allied plant) has sometimes been included under *B. quadripartitum*. The specimens listed below agree closely with authentic specimens of this latter species in the Taylor Herbarium and also with a drawing in the Sullivant collection made from material collected on the Wilkes Expedition. The main differences between the two are the following: *B. quadripartitum* is smaller than *B. pilosum*, and its smaller leaves are less deeply parted (about $\frac{2}{3}$), the undivided basal part being about 6 cells across; the leaf-cells are shorter; the leaf-segments are either entire (on slender branches) or sparingly toothed, there being only 1–3 pairs of teeth for each segment, except on the leaf-margins, where there may be 1 or 2 extra ones; the teeth are always short and simple; even on the bracts, where the teeth of the segments are often

[1] Lond. Jour. Bot. **3**: 290. 1844. Fl. Ant. **1**: 161. *pl. 65. f. 9.* 1844.

[2] Lebermoose der Forschungsreise S. M. S. "Gazelle," 19. 1890.

[3] Jour. Bot. **25**: 193–195. *pl. 275.* 1887.

6–8 in number on each side, they remain short, rarely being more than 3 or 4 cells in length.

11. BLEPHAROSTOMA QUADRIPARTITUM (Hook.) Trevis. Mem. reale Ist. Lomb. di Sci. e Lett. III. **4**: 417. 1877.

Pl. IV, Fig. 7–8.

Jungermannia quadripartita Hook. Musc. Exot. *pl. 117*. 1820.
Temnomia quadripartita Mitt. Jour. Linn. Soc. **15**: 68. 1877.
Jungermannia podophylla Ångstr. Öfversigt af Kongl. Vetensk.-Akad. Förhand. **29**, Häft 4: 11. 1872 (*fide* Pearson).
Fuegia.

12. CHILOSCYPHUS MASSALONGOANUS Steph. Hedwigia, **32**: 325. 1893.
Chiloscyphus fissistipus Massal. Nuovo Gior. Bot. Ital. **17**: 299. *pl. 18. f. 16*. 1885. (Non Hook. f. & Tayl.)
Chiloscyphus fissistipus var. *magellanicus* Schiffn. & Gottsche, Lebermoose der Forschungsreise S. M. S. "Gazelle," 14. *pl. 2. f. 18*. 1890.
Villarino Bay. (By Savatier in W. Patag. & W. Magell.)

13. FOSSOMBRONIA NAUMANII Schiffn. & Gottsche, Lebermoose der Forschungsreise S. M. S. "Gazelle," 39. *pl. 7. f. 23–25*. 1890.
Fuegia.

The present material is all sterile and can only be referred provisionally to the above species, from which it differs in certain points. Professor Schiffner has kindly compared the Patagonian plant with the type of *F. naumanii* from Kerguelen Island and writes me the following note in regard to it: "Differt a *F. naumanii* statura majore, rhizoidis pallidis (nec violaceo-rubris), absentia squamularum dorsalium. Foliorum forma et reticulatione bene congruit. Æque ac *F. naumanii* planta aquatica vel imo palustris esse videtur." In the total absence of reproductive organs it seems wisest not to give our plant a new name.

14. FRULLANIA BOVEANA Massal. Nuovo Gior. Bot. Ital. **17**: 244. *pl. 23. f. 27*. 1885.
Fuegia. (W. Magellan, Dusén; Fuegia, Hariot.)

15. HARIOTIELLA HERMITENSIS Massal. & Besch. Nuovo Gior. Bot. Ital. **5**: 256. 1898 (new series).

Polyotus? hariotianus Besch. & Massal. Bull. Soc. Linn. de Paris, 639. 1886.

Lepidolæna hariotiana Schiffn. in Engler & Prantl, Nat. Pfl. Fam. **1**[3]: 110. 1895.

Lapataia.

16. HARPALEJEUNEA SUBFENESTRATA (Massal.) Schiffn. & Gottsche, Lebermoose der Forschungreise S. M. S. "Gazelle," 28. *pl. 6. f. 10, 11.* 1890.

Lejeunea subfenestrata Massal. Nuovo Gior. Bot. Ital. **17**: 249. *pl. 25. f. 30.* 1885.

Villarino Bay.

17. JAMESONIELLA COLORATA (Lehm.) Schiffn. in Engler & Prantl, Nat. Pfl. Fam. **1**[3]: 83. 1893.

Jungermannia colorata Lehm. Linnæa, **4**: 366. 1829.

Villarino Bay. (By Savatier in W. Patag.)

18. JUNGERMANNIA ANTARCTICA Ångstr. Öfversigt af Kongl. Vetensk. Akad. Förhand. **29**, Heft. 4: 10. 1872.

Jungermannia pigafettoana Massal. Nuovo Gior. Bot. Ital. **17**: 217. *pl. 14.* 1885.

Lapataia.

Through the kindness of Professor Nathorst, of Stockholm, I have been enabled to examine a part of Ångström's type of this species, which is preserved in the collections of the Royal Academy of Science; the specimens agree in all respects with those collected by Mr. Hatcher and also with the published description and figures of *Jungermannia pigafettoana*. The original description of Ångström does not give an accurate account of the underleaves. In the diagnosis of the species, we read: "amphigastria ovato- vel lanceolato-subulata"; and, in the fuller description which follows, it is stated: "amphigastria caulis inferioris ovato-subulata, utrinque in parte basali et sub subulam dente uno subulato instructa; in parte superiori caulis lanceolato-subulato subintegra sunt."

As a matter of fact, the underleaves are deeply 2-parted, and the description quoted above applies to the divisions and not to the complete structures. Ångström also omits mention of the cuticle of the leaves, which is strongly verrucose, and is one of the most striking peculiarities of the plant.

19. JUNGERMANNIA HATCHERI Evans, Torrey Bulletin, 25: 417. 1898.

Pl. V, Figs. 1–7.

Jungermannia barbata, B. floerkii Gottsche, Die Lebermoose Süd-Georgiens, 450. *pl. 6.* 1890. Non *Jungermannia floerkii* Web. & Mohr.

Sterile: plants loosely cæspitose or creeping over tufts of *Lophocolea rigens*, yellowish-brown; stems simple or sparingly branched, densely radiculose; leaves closely imbricated, obliquely inserted, more or less crispate, broadly quadrate; abruptly widening from the base, not decurrent, cleft one third or more into 4 obtuse, acute or cuspidate lobes, separated by obtuse or lunulate sinuses, postical margin bearing near the base a cluster of 2–5 fine hair-like cilia, each consisting of 2–8 cells, usually in a single row; underleaves divided almost to the base into 2 slender divisions, bearing cilia in the lower part; leaf-cells rather thin-walled with distinct trigones, cuticle smooth or nearly so; gemmæ reddish-brown, borne in chains and forming clusters on the teeth of the upper leaves, angular, composed of 1 or 2 cells.

Stems .5–1 cm. long, 0.35 mm. in diameter; leaves 1.55 mm. long, 1.20 mm. wide; underleaves 0.55 mm. long, 0.15 mm. wide; leaf-cells on margin 15 μ, in the middle 19 μ, and at the base 23 μ in diameter; gemmæ 15 μ in diameter.

Lapataia.

The present species is an antarctic representative of the *barbatæ*-group of the genus *Jungermannia*, a group of closely allied plants, which forms a most conspicuous feature of the hepatic floras of northern and arctic regions. The presence of basal cilia on the leaves shows an approach to *J. lycopodioides* and *J. floerkii*, and to the latter species the Patagonian plant bears a marked resemblance. The principal points of difference have already been indicated by Gottsche. In *J. floerkii*, the leaves do not broaden out so abruptly from the base as in *J. hatcheri*, their lateral margins are more nearly parallel and their more robust basal cilia are often 2 or 3 cells wide in the lower part; the underleaves are much larger

and their segments are often 8–10 cells broad at the base instead of only 3 or 4 cells; in *J. hatcheri*, moreover, the segments end in a single row of 10–20 cells, whereas in *J. floerkii*, there are usually less than 10 cells. The occasional cuspidate leaf-lobes of *J. hatcheri* remind one of the similar structures found in *J. lycopodioides*, but this latter species is much more robust, and has longer and more tortuous basal cilia and larger underleaves with broader and more densely ciliated segments.

20. JUNGERMANNIA PROPAGULIFERA Gottsche, Die Lebermoose Süd Georgiens, 451. *pl. 1. f. 6–12.* 1890.

Plate V, Figs. 8–18.

Paroicous: plants cæspitose, mixed with the preceding species, yellowish-brown or reddish; stems creeping or ascending, branching by innovations, radiculose: leaves imbricated, ovate-quadrate, obliquely spreading, not decurrent, concave, bifid about one third with subacute sinus and lobes, the antical lobe slightly smaller, otherwise entire (or erose-denticulate from the presence of gemmæ); underleaves wanting; leaf-cells polygonal in outline, thin-walled and without trigones; ♀ inflorescence terminal; bracts in 1 or 2 pairs, mostly erect-spreading, similar to the stem-leaves but more crispate, sometimes trifid and with sparingly and irregularly toothed lobes and margins; bracteole connate on one or both sides, with bracts ovate, bilobed or not segmented, toothed or entire; perianth ovate-cylindrical, composed of a single layer of cells, slightly narrowed and plicate in the upper part, minutely denticulate at the mouth, ♂ bracts in 2–4 pairs, situated just below the ♀ bracts, complicate-bilobed, but similar to the stem-leaves when spread out, scarcely inflated at the base and enclosing 1 or 2 antheridia; gemmæ borne on the leaves near the apices of the lobes, yellowish-brown, oblong, composed of 1 or 2 cells: capsule spherical, purple, borne on a long hyaline stalk; spores yellowish-brown, minutely tuberculate; elaters reddish, bispiral.

Stems .5–1 cm. long, 0.22 mm. in diameter; leaves 0.95 mm. long and wide; leaf-cells 28 μ in diameter at base, 22 μ in other parts of the leaf; bracts 1.2–1.35 mm. long, 0.85–1.2 mm. wide, bracteole 1.0–1.1 mm. long, 0.5 mm. wide, perianth 2.9 mm. long, 1.1 mm. in diameter; gemmæ 20 μ in diameter; spores 12–14 μ in diameter.

Lapataia.

In his description of *Jungermannia propagulifera*, Gottsche calls attention to the peculiarities of the perigonial bracts and the gemmiparous stems, but says that the perichætial bracts with the female flowers are still to be desired, thereby implying that the species is dioicous. In other respects the description agrees very closely with the plants collected by Mr. Hatcher, and it seems best to refer the latter's specimens, provisionally at any rate, to Gottsche's species. Curiously enough, both the South Georgian and the Fuegian specimens were found growing with *Jungermannia hatcheri*. *J. propagulifera* is nearly allied to the European *J. socia* Nees, which certain authors[1] consider a variety of *J. excisa* Dicks. It resembles this species in its paroicous inflorescence, in its absence of underleaves, etc. In the European species, however, the leaves are less deeply bifid, so that the sinus is obtuse or lunulate, the leaf-cells have thicker walls and there are slight differences in the bracts.

21. LEJEUNEA SAVATIERIANA Besch. & Massal. Bull. Soc. Linn. de Paris, 638. 1886.

Harpalejeunea savatieriana Schiffn. & Gottsche, Lebermoose der Forschungsreise S. M. S. "Gazelle," 29. *pl. 6. f. 7.* 1890.

Villarino Bay. (By Savatier in W. Patagonia.)

22. LEPICOLEA OCHROLEUCA (Spreng.) Lindb. Acta Soc. Sci. Fenn. **10**: 516. 1875.

Jungermannia ochroleuca Spreng. Syst. Veg. **4**: 325. 1829.
Sendtnera ochroleuca Nees in G. L. & N. Syn. Hep. 240. 1845.
Leperoma ochroleuca Mitt. in Hook. f. Handb. of the N. Zeal. Fl. 754. 1867.
Herberta ochroleuca Trevis. Mem. reale Ist. Lomb. di Sci. e Lett. III. **4**: 397. 1877.

Villarino Bay, etc. (W. Magellan, Dusén.)

23. LEPIDOLÆNA MAGELLANICA (Lam.) Lindb. Jour. Linn. Soc. **13**: 194. 1873.

Jungermannia magellanica Lam. Encycl. Bot. **3**: 284.
Polyotus magellanicus Gottsche in G. L. & N. Syn. Hep. 248. 1845.
Gackströmia magellanica Trevis. Mem. reale Ist. Lomb. di Sci. e Lett. III. **4**: 397. 1877.

Fuegia. (W. Magellan, Savatier.)

[1] Cf. Massalongo, Atti della Soc. Veneto-Trent. di Sc. Nat. II. **2**: (19). 1895.

24. LEPIDOLÆNA MENZIESII (Hook.) Dumort. Recueil d'obs. sur les Jung. 13. 1835.

Jungermannia menziesii Hook. Musc. Exot. *pl. 118.* 1820.

Polyotus menziesii Gottsche in G. L. & N. Syn. Hep. 247. 1845.

Fuegia. (W. Magellan, Savatier.)

25. LEPIDOZIA FILAMENTOSA Lehm. & Lindenb. in G. L. & N. Syn. Hep. 207. 1845.

Jungermannia filamentosa Lehm. & Lindenb. in Lehm. Pugillus, **4**: 29. 1832.

Mastigophora filamentosa Trevis. Mem. reale Ist Lomb. di Sci. e Lett. III. **4**: 416. 1877.

Villarino Bay. (By Savatier in W. Magellan, by Hahn in Isle Hoste.)

26. LEPIDOZIA PLUMULOSA Lehm. & Lindenb. in G. L. & N. Syn. Hep. 211. 1845.

Jungermannia plumulosa Lehm. & Lindenb. in Lehm. Pugillus, **6**: 30. 1834.

Mastigophora plumulosa Trevis. Mem. reale Ist. Lomb. di Sci. e Lett. III. **4**: 416. 1877.

Lepidozia tetradactyia Tayl. in G. L. & Syn. Hep. 213. 1845.

Jungermannia tetradactyla Hook. f. & Tayl. Lond. Jour. Bot. **3**: 306. 1844.

Fuegia. (W. Magellan, Dusén.)

27. LEPIDOZIA TRUNCATELLA Nees in G. L. & N. Syn. Hep. 209. 1845.

Mastigophora truncatella Trevis. Mem. reale Ist Lomb. di Sci. e Lett. III. **4**: 416. 1877.

Fuegia.

28. LOPHOCOLEA BIDENTATA (L.) Dumort. Recueil d'obs. sur les Jung. 17. 1835.

Lapataia.

29. LOPHOCOLEA STENOPHYLLA Schiffn. & Gottsche, Lebermoose der Forschungsreise S. M. S. Gazelle, 12. *pl. 3. f. 25–28.* 1890.

Villarino Bay.

30. LOPHOCOLEA HORIZONTALIS (Hook.).

Jungermannia horizontalis Hook. Musc. Exot. *pl. 96.* 1818.
Chiloscyphus horizontalis Nees in G. L. & N. Syn. Hep. 177. 1845.
Jungermannia grandifolia Hook. f. & Tayl. Lond. Jour. Bot. **3**: 474. 1844.
Chiloscyphus grandifolius Tayl. in G. L. & N. Syn. Hep. 185. 1845.
Villarino Bay.

31. LOPHOCOLEA LENTA (Hook. f. & Tayl.) Tayl. in G. L. & N. Syn. Hep. 162. 1845.

Jungermannia lenta Hook. f. & Tayl. Lond. Jour. Bot. **3**: 379. 1844.
Jungermannia diadema ta Hook. f. & Tayl. *l. c.* **3**: 560. 1844.
Jungermannia secundifolia Hook. f. & Tayl. *l. c.* **3**: 471. 1844.
Lapataia.

32. LOPHOCOLEA OBVOLUTA (Hook. f. & Tayl.).

Jungermannia obvoluta Hook. f. & Tayl. Lond. Jour. Bot. **4**: 80. 1845.
Fuegia.

In the original description of this species no station is given except the Falkland Islands. In the Flora Antarctica, Hermite Island, Cape Horn, is also mentioned. Under the name *Jungermannia obvoluta*, two plants are preserved in the Taylor herbarium; the first of these from the Falkland Islands, must be considered the type of the species; the second from Cape Horn, is apparently distinct, but there is so little of it that it would be unwise to attempt to describe it. In the type-specimen a well-developed leaf is almost longitudinally inserted and is attached by a very broad base, the distance from side to side being about twice as great as that from base to apex. The leaf is more or less distinctly divided into two unequal lobes; the postical, which is slightly the larger, is concave and rounded at the base and extends beyond the stem, at the apex it is bidentate but is otherwise entire; the antical lobe is decurrent and is irregularly lobed and dentate. The leaf-cells average 25 μ in diameter. The specimens collected on the Albatross expedition and referred by the writer to *L. obvolutæformis*[1] agree closely with this type. In Mr. Hatcher's specimens the postical lobe is more coarsely and irregularly dentate than in the type and the leaf-cells are a little smaller, averaging 21 μ in diameter, but the plants are otherwise so similar that they can hardly be separated.

[1] Contr. U. S. Nat. Herb. **1**: 140. 1892.

It is probable that *Lophocolea obvolutæformis* (De Not.) Massal. also belongs here, although the published descriptions[1] of this species differ from Taylor's specimen in a few minor details. The figure of *L. obvoluta* in the Flora Antarctica does not well represent the species.

33. Lophocolea pallide-virens (Hook. f. & Tayl.) Mitt. Jour. Linn. Soc. **15**: 72. 1877.

Jungermannia pallide-virens Hook. f. & Tayl. Lond. Jour. Bot. **3**: 473. 1844.

Chiloscyphus pallide-virens Tayl. in G. L. & N. Syn. Hep. 179. 1845.

Villarino Bay.

34. Lophocolea puccioana (De Not.) Massal. var. suspecta Massal. Nuovo Gior. Bot. Ital. **17**: 228. *pl. 17. f. 1–9.* 1885.

Villarino Bay. (W. Magellan, Dusén; Fuegia, Hariot.)

Professor Massalongo has kindly confirmed my determination of these specimens. In the Sullivant collection there is a drawing labeled "*Jungermannia humilis*" which was made from specimens collected by the Wilkes Expedition. The drawing represents a plant which is identical with Mr. Hatcher's specimens. As, however, *Jungermannia humilis* Hook. f. & Tayl.[2] seems to have been a composite species and as Mitten[3] has applied the name to a plant without underleaves, it seems wisest not to change the name of De Notaris' plant. *Jungermannia humilis* is apparently not represented in the Taylor herbarium.

35. Lophocolea rigens (Hook. f. & Tayl.).

Jungermannia rigens Hook. f. & Tayl. Lond. Jour. Bot. **3**: 461. 1844.

Dioicous: densely cæspitose, yellowish-green; stems ascending and giving off numerous simple or subdivided, ascending or erect, lateral branches, sparingly radiculose, the radicles in clusters at the bases of the underleaves: leaves imbricated, obliquely inserted, erect-spreading, strongly concave or convolute (especially on the branches), broadly ovate or orbicular, bifid about one fourth with acute, obtuse or lunulate sinus and acute teeth, otherwise entire, more or less decurrent at antical base: underleaves ovate, bifid one third or more with narrow sharp lobes, usually bearing on

[1] Mem. Acc. Tor. II. **16**: *f. 8.* 1855. Nuova Gior. Bot. Ital. **17**: 223. 1885.

[2] Lond. Jour. Bot. **3**: 468. 1844.

[3] Bot. of Kerguelen Island: Transit of Venus Expedition, 34. 1874.

each side a small tooth at about the middle, otherwise entire: leaf-cells polygonal, thin-walled, slightly or not at all thickened at the angles: ♀ inflorescence terminal, sometimes innovating, bracts in two or three pairs, less obliquely inserted and slightly larger than the leaves but scarcely different from them in shape; bracteole ovate, bifid about one third and bearing a small tooth on each side above the middle; perianth (young) campanulate, 3-keeled but without wings, 3-lobed at the wide, open mouth and coarsely and irregularly toothed: ♂ infloresence borne in the course of a branch, bracts in several (about 5) pairs, imbricated and convolute, similar in shape to the stem-leaves when spread out, but expanding at the antical base into an inflated pouch usually tipped with a tooth; underleaves not modified.

Stems .5–1 cm. long, 0.2 mm. in diameter; leaves (large) 0.75 mm. long and wide; underleaves (large) 0.35 mm. long, 0.3 mm. wide; leaf-cells at edge of leaf 16 μ, in middle 21 μ and at base 25 μ in diameter; perichætialbracts 1 mm. long, 0.85 mm. wide; bracteole 0.95 mm. long, 0.7 mm. wide; perigonial bracts 0.7 mm. long, 0.5 mm. wide.

Lapataia.

This distinct little *Lophocolea* does not seem to have been recorded since its original discovery in the Falkland Islands. Mr. Hatcher's specimens agree very closely with the sterile type material in the Taylor herbarium, and I have given a full account of the species because the original description is far from complete and the figure given in the Flora Antarctica does not adequately represent the plant. Fruiting stems seem to be very rare, the plant apparently spreading by means of small branches, which, when dry, easily become detached.

The authors of *Jungermannia rigens* compared it with the European *J. francisci* Hook., and in the Synopsis it is placed close to that species; the position of the branches, however, which are produced near the postical basal angle of the subtending leaves would at once remove it from the genus *Cephalozia* in which *J. francisci* is now included. *L. rigens* belongs in the puzzling group of *Lophocolea* with bifid leaves. Its small size and yellowish-green color, the curious rolling up of its leaves, which often gives the branches a worm-like appearance and the slight modifications which its bracts undergo will serve to distinguish it.

36. LOPHOCOLEA VASCULOSA (Hook. f. & Tayl.) Nees in G. L. & N. Syn. Hep. 702. 1847.

Jungermannia vasculosa Hook. f. & Tayl. Lond. Jour. Bot. **3**: 461. 1844.
Jungermannia elata Gottsche, Die Lebermoose Süd-Georgiens, 450. *pl. 7. f. 3–6.* 1890.

On trees, Cordilleras of Patagonia. (By Hariot in Fuegia.)

The figures of this species in the Flora Antarctica give a false idea of the underleaves, which are much narrower than is represented. The quoted illustration of *Jungermannia elata*, however, is more accurate in this respect. The Patagonian plants agree closely with the types of *J. vasculosa* in the Taylor Herbarium.

37. MARCHANTIA POLYMORPHA L. Sp. Pl. 1137. 1753.

Cordilleras of Patagonia: Fuegia.

Although the species of *Marchantia* which were collected during the Antarctic voyage were identified by Hooker and Taylor as *M. polymorpha*, they were afterwards referred by Mitten to *M. tabularis* Nees.[1] I had hoped to find the latter species in the present collection, but a study of numerous specimens and a comparison with an authentic, African plant of *M. tabularis*,[2] kindly sent me by Herr Stephani, have shown conclusively that Mr. Hatcher's material of this genus is all referable to *M. polymorpha*.

38. MARSUPIDIUM CRYSTALLINUM (Massal.) Besch. & Massal. Compt. rend. de la Miss. Sc. du Cap Horn, **5**: 229. 1889.

Gymnanthe crystallina Massal. Nuovo Gior. Bot. Ital. **17**: 239. *pl. 22. f. 24.* 1885.
Acrobolbus excisus Schiffn. in Engler & Prantl, Nat. Pfl. Fam. **I**[3]: 86. 1893.

Fuegia.

The material of this species is all sterile, and is present in small amount. My determination has been kindly verified by Professor Massalongo. It is doubtful if the plant can be retained in *Marsupidium*, as we now understand that genus.

[1] Hook. f. Handb. N. Zeal. Fl. 545. 1867.

[2] According to Schiffner (Oesterr. botan. Zeitschrift. 1896), *Marchantia tabularis* Nees is a synonym of the older *M. berteroana* Lehm. & Lindenb.

39. MARSUPIDIUM URVILLEANUM (Mont.) Mitt. in Hook. f. Handb. N. Zeal. Fl. 754. 1867.

Plagiochila urvilleana Mont. Ann. des Sc. Nat. II. **19**: 247. 1843.
Scapania urvilleana Mont. in G. L. & N. Syn. Hep. 63. 1844.
Jungermannia urvilleana Hook. f. & Tayl. Lond. Jour. Bot. **3**: 468. 1844.
Gymnanthe urvilleana Tayl. in G. L. & N. Syn. Hep. 193. 1845.
Acrobolbus urvilleanus Trevis. Mem. reale Ist. Lomb. di Sci. e Lett. III. **4**: 423. 1877.
Jungermannia abbreviata Hook. f. & Tayl. Lond. Jour. Bot. **3**: 374. 1844.
Plagiochila abbreviata Tayl. in G. L. & N. Syn. Hep. 646. 1847.
Fuegia.

40. METZGERIA FRONTIPILIS Lindb. Acta Soc. pro Faun. et Flor. Fenn. **1**: 14. *f. 2.* 1877.

Fuegia. (W. Magellan, Savatier.)

41. MYLIA ABDITA (Sulliv.).

Plagiochila abdita Sulliv. in Hook. Jour. Bot. and Kew Gard. Misc. **2**: 317. 1850.
Leioscyphus pallens Mitt. Jour. Linn. Soc. **15**: 68. 1877.
Lapataia.

The type of *Plagiochila abdita* is not to be found at present in the Sullivant Herbarium, but there is a drawing of the species there, which agrees very closely with the Lapataia specimens and also with the published descriptions and figures[1] of *Leioscyphus pallens*. The two genera, *Mylia* and *Leioscyphus* (or *Leptoscyphus*), are both given places by Schiffner[2] in his recent treatment of the genera of Hepaticæ. He recognizes, however, that they are very close to each other and points out only two, purely vegetative, characters to distinguish them: in *Mylia* the leaves are said to be *alternate* and the underleaves *undivided;* whereas in *Leioscyphus*, the leaves are said to be *opposite* and the underleaves *bifid*. The first distinction, however, does not hold, as there are acknowleged species

[1] Mitten, Botany of Kerguelen Island: Transit of Venus Expedition, *pl. 3. f. 6.* 1874. Schiffner and Gottsche, Lebermoose der Forschungsreise S. M. S. "Gazelle," *pl. 3. f. 4, 5.* 1890.

[2] Engler & Prantl, Nat. Pfl. Fam. i. 3. pp. 89, 90. 1893.

of *Leioscyphus* (*e. g.*, *L. chiloscyphoideus*) with alternate leaves; and the second distinction seems hardly sufficient to separate the genera.

42. MYLIA CHILOSCYPHOIDEA (Lindenb.).

Plagiochila chiloscyphoidea Lindenb. in Lehmann, Pugillus, **8**: 4. 1844.
Leioscyphus chiloscyphoideus Mitt. Fl. Tasmaniæ, **2**: 225. 1860.

Fuegia.

43. PIGAFETTOA CRENULATA Massal. Nuovo Gior. Bot. Ital. **17**: 237. *pl. 21. f. 23.* 1885.

Villarino Bay. (By Savatier in W. Patagonia.)

44. PLAGIOCHILA ANSATA Hook. f. & Tayl. in G. L. & N. Syn. Hep. 649. 1847.

Pl. VI, Figs. 1–9.

Jungermannia ansata Hook. f. & Tayl. Lond. Jour. Bot. **3**: 457. 1844.
Plagiochila circinalis var. Besch. & Massal. Bull. Soc. Linn. de Paris, 627. 1886.

Dioicous: plants growing in loose tufts, blackish-brown varying to pale brown or yellowish-green: stems simple or sparingly branched, sometimes innovating from below the perianth, slightly or not at all radiculose: leaves distant or subimbricated, erect-spreading or erect and appressed to the stem, orbicular-obovate, rounded at the broad apex, cuneate at the base, margin entire or repand, the antical decurrent, the postical rounded near the base and less decurrent: underleaves wanting: leaf-cells polygonal (mostly 6-sided), becoming elongated toward base, trigones very conspicuous, separated by narrow thin-walled regions or pits: ♀ inflorescence terminal, the bracts in 2 or 3 pairs, passing by gradual transitions into the stem-leaves, the margins coarsely and irregularly dentate with 1–5 sharp teeth or blunt projections, innermost bracts narrower than the others, ovate or obovate in shape; perianth long-exserted, flattened, exalate, clavate, very gradually narrowed toward the base and truncate at the apex, mouth bilabiate, ciliate-dentate, perianth 2 cells thick except close to the base where it is 3 cells and near the mouth where it is only one cell.

Stem 5 cm. or more long, 0.25 mm. in diameter; leaves 1.5 mm. long, 1.4 mm. wide; leaf-cells on edge of leaf 25 μ, in the middle 29 μ and at

the base 53 $\mu \times 29\,\mu$; bracts of innermost row 1.5 mm. × 0.95 mm. and 1.7 mm. × 1.35 mm., perianth 4 mm. long, 1.2 mm. wide.

Villarino Bay.

Plagiochila ansata is a species of wide distribution in southern regions, having been reported also from the Falkland Islands and from New Zealand. The type specimens from the first of these localities agree closely with the Fuegian plants; but, as the published descriptions and figures of the species are somewhat inadequate, it has seemed advisable to describe and figure it anew. The description given above is drawn from robust stems, particularly those bearing perianths; sterile stems and the branches and innovations of fertile plants are sometimes much more slender and bear scattered and smaller leaves. Even in the most slender forms, however, the characteristic leaf-cells with their well-developed trigones are retained. Judging from the description, the specimens doubtfully referred by Bescherelle and Massalongo to *Plagiochila circinalis* belong here. Herr Stephani has kindly sent me a specimen of the last-named species from Australia; and, although it is certainly a near ally of *P. ansata*, it differs from it in the following points: the plants are more robust, the leaves are densely imbricated and their antical margins spread out from the stem and are strongly revolute throughout nearly their whole length, the leaf-cells are scarcely, if at all, elongated at the base, their trigones are even more conspicuous, they are oval or circular in outline and are very frequently confluent.

45. PLAGIOCHILA BISPINOSA Lindenb. Ann. Sci. Nat. IV. **8**: 326. *pl. 11. f. 7–13.* 1858.

Villarino Bay. (W. Magellan, Savatier.)

46. PLAGIOCHILA DURICAULIS Hook. f. & Tayl. in G. L. & N. Syn. Hep. 641. 1847.

Jungermannia duricaulis Hook. f. & Tayl. Lond. Jour. Bot. **3**: 458. 1844.

Fuegia. (W. Magellan, Savatier.)

47. PORELLA FŒTENS (De Not.) Trevis. Mem. reale Ist. Lomb. di Sci. e Lett. III. **4**: 407. 1877.

Madotheca fœtens De Not. Mem. Acc. Tor. II. **16**: 231. *f. 17.* 1855.

Villarino Bay.

48. RADULA FLAVIFOLIA Tayl. in G. L. & N. Syn. Hep. 259. 1845.
Jungermannia flavifolia Hook. f. &. Tayl. Lond. Jour. Bot. **3**: 476. 1844.
Fuegia.

49. SCHISTOCHILA GAYANA (Gottsche) var. MASSALONGOANA (Schiffn. & Gottsche).
Gottschea gayana var. Massal. Nuovo Gior. Bot. Ital. **17**: 205. *pl. 12. f. 2.* 1885.
Gottschea gayana var. *massalongoana* Schiffn. & Gottsche, Lebermoose der Forschungsreise S. M. S. "Gazelle," 2. 1890.
Villarino Bay. (W. Magellan, Dusén.)

50. SCHISTOCHILA LAMELLATA (Hook.) Dum. Recueil d'obs. sur les Jung. 15. 1835.
Jungermannia lamellata Hook. Musc. Exot. *pl. 49.* 1818.
Gottschea lamellata Nees in G. L. & N. Syn. Hep. 20. 1844.
Villarino Bay. (W. Magellan, Dusén.)

51. SCHISTOCHILA LAMINIGERA (Hook. f. & Tayl.) Evans, Contr. U. S. Nat. Herb. **1**: 141. 1892.
Jungermannia laminigera Hook. f. & Tayl. Lond. Journ. Bot. **3**: 456. 1844.
Gottschea laminigera Tayl. in G. L. & N. Syn. Hep. 623. 1846.
Fuegia.

52. TRICHOCOLEA TOMENTOSA (Swartz) Gottsche in G. & R. Hep. Eur. Exs. no. 272.
Jungermannia tomentosa Swartz, Prod. Fl. Ind. occ. 145. 1788.
Jungermannia tomentella var. *tomentosa* Lindenb. Hep. Eur. 19. 1829.
Trichocolea tomentella var. *tomentosa* G. L. & N. Syn. Hep. 237. 1844.
Leiomitra tomentosa Lindb. Acta Soc. Sci. Fenn. **10**: 515. 1875.
Basichiton tomentosum Trevis. Mem. reale Ist. Lomb. di Sci. e Lett. III. **4**: 394. 1877.
Fuegia. (By Savatier in W. Magellan.)

53. TYLIMANTHUS ANDERSSONII (Ångstr.).

Pl. VI, Figs. 10–19.

Jungermannia tenella Ångstr. Öfversigt af Kongl. Vetensk.-Akad. Förhand. **29**, Häft 4: 11. 1872. (Not Hook f. & Tayl.).

Gymnanthe anderssonii Ångstr. l. c. **33**, Häft **4**: 50. 1876.

Dioicous: growing in loose tufts or mixed with other hepaticæ, pale or whitish-green: plants consisting of a prostrate caudex giving rise to ascending or erect stems: caudex radiculose, usually bearing scattered rudimentary leaves: stems without rhizoids or with a few scattered ones close to the caudex, simple or sparingly branched, sometimes giving off radiculose stolons from the lower part; stem-leaves distant and rudimentary below, more or less imbricated and larger above, obliquely inserted, somewhat concave, obovate-orbicular from a narrowed base, antical margin decurrent, straight or slightly curved, entire, postical margin reaching nearly to middle of stem, slightly or not at all decurrent, entire, sinuate, or with a few scattered teeth, apex broad and variable, sometimes distinctly emarginate-bilobed, with acute, obtuse or rounded lobes, sometimes truncate, entire or sparingly and irregularly dentate with blunt teeth; underleaves wanting; leaf-cells thin-walled with small but distinct trigones, somewhat elongated toward base, cuticle smooth: ♀ inflorescence terminal on short ascending stems or elongated branches; bracts crowded, similar to the leaves, but even more irregular in shape, sometimes unequally 2-lobed, the innermost narrower and more delicate than the others and sometimes more conspicuously toothed, sac tapering to a blunt point, radiculose: ♂ inflorescence borne in the course of ascending stems, bracts in about five pairs, imbricated, strongly saccate below, but with spreading apices above, broadly orbicular when explanate, truncate or emarginate-bifid, the postical lobe being the larger.

Stems 1.5–3 cm. long, 0.35 mm. in diameter; leaves 1.7 mm. long, 1.85 mm. broad; leaf-cells at base 58 μ long, 29 μ broad, in other parts of the leaf 29 μ in diameter; outer perichætial bracts 1.9 mm. long and broad, sac 2.7 mm. long, 1 mm. in diameter; perigonial bracts 1 mm. long, 1.45 mm. wide. The foregoing measurements may be considered representative of this very variable species.

Lapataia.

In its pale color and in the shape and areolation of its leaves, the present plant strongly resembles *Marsupidium urvilleanum*, which is a more robust species with its leaves more strongly dentate and inflexed on their antical margins. As far as can be judged from descriptions, the two species differ from each other in the position of the ♀ inflorescence and pendant sac, necessitating their separation into distinct genera. In *Marsupi-*

dium urvilleanum, this sac is described by Mitten[1] as "attached to the lower part of the stem by its side"; in the closely related (if not identical) *M. brecknockiense* (Massal.) Besch. and Massal., its author[2] says: "perichætia ad ramorum basim et in ramulo brevissimo sublaterali radicante posita"; in the species described above, on the contrary, the sac is clearly terminal on ascending stems or elongated branches, showing that the plant is a *Tylimanthus*. The sac moreover has the same structure as that ascribed to this genus — its wall is closely adherent to the calyptra and it bears a cluster of unfertilized archegonia at its mouth. At my request Professor Nathorst has kindly sent me some of the original specimens of *Gymnanthe anderssonii* as determined by Ångström. So far as can be decided from sterile plants, these belong to the same species as Mr. Hatcher's specimens, although in some of them the leaves are a little more toothed.

Supplementary List of Patagonian Hepaticæ.

The hepaticæ collected in the Magellan-region and in Fuegia by the French *Mission Scientifique du Cap Horn*, 1882–1883, described by Bescherelle and Massalongo, and those collected by Dusén in 1896, and described by F. Stephani, contain the following species in addition to some of the species in the Hatcher Collection.[3]

Adelanthus magellanicus (Ldbg.) Spruce.	W. Magell.; S. Fuegia.
A. unciformis (H. f. & Tayl.) Spr.	W. Patagon.
Acolea concinnata Dum.	S. Fuegia.
Alicularia spathulifolia Steph.	W. Magellan, 200 m. above sea-level.
Anastrophyllum decurrens Steph.	W. Magell.
A. involutifolium (Mont.).	W. Magell.
A. longissimum Steph.	W. Magell.
Aneura floribunda Steph.	S. Patag.; W. Magell.; N. Fuegia.
A. fragilis Steph.	W. Magell.; S. Fuegia.
A. pallide-virens Steph.	W. Magell.
A. pinnatifida Nees.	S. Patagon.; S. Fuegia.
A. pulvinata Steph.	W. Magell.
A. spectabilis Steph.	W. Magell.; E. & S. Fuegia.
A. tenax Steph.	W. Magell.

[1] Handb. N. Zeal. Fl. 754. 1867.

[2] Nuovo Gior. Bot. Ital. **17**: 214. 1885.

[3] *Miss. Scient. du Cap Horn.* Tom V. Botanique, Paris, 1889, Hépatiques, pp. 201–252; *Lebermoose der Magellansländer* von F. Stephani, mit einer Einleitung von P. Dusén, Bihang till K. Svenska Vet.-Akad. Handlingar. 26. III. 17. Stockholm, 1901.

Anthoceros jamesonii Tayl.	S. Fuegia, by Ushuaia.
Balantiopsis chilensis Steph.	W. Magell.
Bazzania novæ-zelandiæ (Mitten).	Magell., Desolation I.
Brachio-lejeunea spruceana Mass.	W. Magell.
Cephalozia scabrella Mass.	W. Magell.
C. simulans Mass.	Fuegia.
C. tabulata Hook. f. & Tayl.	W. Magell.; S. Fuegia.
Chiloscyphus coalitus (Hook.) Nees.	W. Patagon.
C. (?) grandiflorus Tayl. & H. f.	Magell.
C. horizontalis (Hook.) Nees.	W. Magell.; S. Fuegia.
C. integrifolius N. & N. L. & L.	W. Magell.
C. (?) pallide-virens Tayl.	Fuegia.
C. striatellus Mass.	W. Magell.
C. valdiviensis Mont.	W. Magell.
Diplophyllum densifolium Hook.	W. Magell.; S. Fuegia.
Frullania diplota Tayl.	S. Patagon.; N. & S. Fuegia.
F. fertilis DeNot.	S. Patagon.; S. Fuegia.
F. ptychantha Mont.	W. Magell.
Gottschea gayana Gott.	W. Patagon.
G. lamellata (Hook.) Nees.	Magell.; W. Patagon.
G. laminigera.	W. Magell.
G. pachyla.	W. Magell.; Fuegia.
G. splachnophylla Tayl.	Magell.
Isotachis anceps Mont.	W. Magell.; S. Fuegia.
I. bisbifida Steph.	W. Magell.
I. madida Tayl.	W. Magell.; at 250 m. above sea-level.
I. quadriloba Steph.	W. Magell.
I. spegazziniana Mass.	W. Magell. & S. Fuegia at 200 m. above sea.
I. splendens Steph.	W. Magell., at 200 m. above sea-level.
Jamesoniella colorata (Lehm.).	S. Fuegia.
J. grandiflora L. & G.	W. Magell.; S. Fuegia. Alpine.
J. œnops (L. & G.) Steph.	W. Magell.
J. paludosa Steph.	W. Magell.
Jungermannia cribrifolia Tayl. & H. f.	Fuegia.
J. parcæformis Mass.	S. Patagon.
J. pigafettoana Mass.	S. Patagon.; S. & W. Fuegia.
J. quadripartita Hook.	Fuegia.
J. schismoides Mont.	S. Fuegia.
Leioscyphus abnormis Mass.	W. Magell.; S. Fuegia.
L. æquatus Tayl.	W. Magell.; S. Fuegia. At elevations.
L. chiloscyphoides L. & L.	W. Magell.; S. Fuegia.
L. repens Mitt.	S. Fuegia.
L. setistipus Steph.	E. & S. Fuegia.
L. surrepens (Tayl.).	W. Magell.; S. Fuegia.
L. turgescens (Tayl.).	W. Magell.; S. Fuegia.

Lejeunia decurvicuspis Besch. & Mass.	W. Patagon.
L. fuegiana Besch. & Mass.	S. Fuegia.
L. parasitica Tayl.	W. Patagon.
L. rufescens Ldbg.	Magell.
L. subfenestrata Mass.	Fuegia.
Leperomia ochroleuca (Spr.) Mitt.	W. Patagon.
Lepicolea quadrilaciniata Sull.	E. & S. Fuegia.
L. teres Steph.	S. Fuegia, by Ushuaia.
Lepidolæna hariotiana (Mass.) Steph.	W. Magell.; S. Fuegia.
L. magellanica (Lam.).	W. Magell.; S. Fuegia.
L. menziesii (Hook.).	W. Magell.; S. Fuegia.
Lepidozia blepharostoma Steph.	W. Magell.
L. capillaris (Swartz) Ldbg.	W. Patagon.
L. capilligera (Schwaegr.) Ldbg.	S. Fuegia.
L. cordulifera DeNot.	S. Patagon.; S. Fuegia.
L. cupressina (Swartz.) Ldbg.	S. Fuegia.
L. oliogophylla L. & L.	W. Magell.; S. Fuegia.
L. plumulosa L. & L.	W. Magell.; S. Fuegia.
L. saddlensis Mass.	W. Magell.; S. Fuegia.
L. seriatitexta Steph.	W. Magell.
L. setiformis DeNot.	S. Fuegia.
Lophocolea austrigena Tayl.	W. Magell.; Fuegia.
L. boveana Mass.	W. Magell. & S. Fueg., at 600 m. elevation.
L. concava Steph.	S. Fuegia.
L. cookiana Mass.	W. Magell.; S. Fuegia.
L. divergenticiliata Steph.	S. Fuegia.
L. fulvella (Steph.).	W. Magell.; S. Fuegia.
L. fuscovirens (Tayl.).	Magellan; S. Fuegia.
L. gayana (Mont.).	W. Magell.
L. gottscheœoides Mass.	W. Magell.; S. Fuegia.
L. humifusa Tayl.	W. & S. Fuegia.
L. humilis Hook. & Tayl.	W. Magell.; S. Fuegia.
L. irregularis Steph.	S. Patagon.; E. & S. Fuegia.
L. lacerata Steph.	W. Magell.
L. muricata (?) Nees.	W. Patagon.
L. novæ-zelandiæ (Lind. & Leh.) Nees.	Fuegia.
L. obvolutæformis Mass.	Magell.
L. otiphylla (Tayl.).	W. Magell.; S. Fuegia.
L. palustris (Tayl.).	W. Magell.; S. Fuegia.
L. purpucilla Tayl.	Fuegia.
L. spegazziniana Mass.	W. Magell.
L. textilis Tayl.	W. Magell.; E. & S. Fuegia.
L. trachyopa Tayl.	Fuegia.
L. triseriata Steph.	W. Magell.; E. Fuegia.
L. vascularis Nees.	S. Fuegia.

L. virens Tayl.	S. Patagon.; W. Magell.; S. Fuegia.
Madotheca subsquarrosa N. & M.	W. Magell.
Marchantia cephaloscypha Steph.	Magell.
M. tabularis Nees.	S. Patagon., S. Fuegia.
Marsupella kerguelensis Schffn.	S. Fuegia, 600 m. above sea-level.
Marsupidium crystallium Mass.	W. Patagon.
Mastigobryum peruvianum Nees.	W. Magell.
Mastigophora antarctica Steph.	W. Magell.
Metzgeria angusta Steph.	S. Patagon.; N. Fuegia.
M. dusenii Steph.	W. Magell.
M. furcata (L.) Ldbg.	W. Magell.
M. glaberrima Steph.	W. Magell.; S. Fuegia. On stems of trees.
M. hamata Ldbg.	S. Fuegia.
M. pubescens Raddi.	S. Fuegia.
Noteroclada confluens Tayl.	Magell.
Plagiochila ambusta Mass.	W. Magell.; S. Fuegia.
P. angulata Steph.	W. Magell.
P. circinalis (Lehm.) Ldbg.	Fuegia.
P. dura DeNot.	W. Magell.
P. fagicola Schffn.	W. Magell.
P. fuegiensis (Mass.).	W. Patagon.
P. heteromalla L. & L.	W. Magell.
P. hirta Tayl.	W. Magell.
P. hyadesiana Mass.	W. Magell.
P. jacquinotii Mont.	Fueg.
P. patagonica Besch. & Mass.	W. Patagon.; W. Magell.
P. lechleri Gottsche.	W. Magell.
P. neesiana Ldbg.	W. Magell.
P. obcuneata Steph.	Magellan.
P. savatierana Besch. & Mass.	W. Magell.; W. Patagon.
P. subpectinata Besch. & Mass.	Fuegia.
P. uncialis H. f. & Tayl.	W. Magell.
P. rectangulata Step.	S. & W. Fuegia.
P. remotidens Steph.	W. Magell.
P. robusta Steph.	S. Fuegia.
Radula helix Tayl.	W. Magell.
R. intempestiva Gottsche.	W. Magell.
R. plicata Mitt.	W. Magell.; S. Fuegia.
R. plumosa Mitt.	In S. Fuegia.
R. punctata Steph.	W. Magell.
R. striata Mitt.	W. Magell.
Reboulia hemisphærica ? (L.) Reddi.	W. Patagon.
Riccardia eriocaula (Hook.).	W. Magell.
R. fuegiensis Mass.	W. Magell.
R. prehensilis (Tayl. & Hk. f.).	W. Patagon.

R. pinguis (L.) Gray.	Fuegia.
R. spegazziniana Mass.	W. Magell.
R. spinulifera Mass.	W. Magell.
Scapania antarctica Steph.	S. Fuegia.
Schisma chilensis De Not.	W. Magell.
Schistocheila cunninghamii Steph.	Magell.; S. Fuegia.
S. pachyla Tayl.	W. Magell.
S. planifolia Steph.	W. Magell.
S. spegazziniana (Mass.).	W. Magell.
S. splachnophyllum (Tayl.).	W. Magell.; S. Fuegia.
Strepsilejeunia warnstorffii Steph.	W. Magell.
Symphyogyna crassifrons Sull.	W. Magell.; S. Fuegia.
Trichocolea verticillata Steph.	W. Magell.; S. Fuegia.
Tylimanthus brecknockiensis Steph.	W. Magell.
T. crystallinus (Mass.) Steph.	W. Magell.
T. integrifolius Steph.	W. Magell., alpine.

EXPLANATION OF PLATE IV.

PAGE

BLEPHAROSTOMA PILOSUM Evans 45

Fig. 1. Plants (× $\frac{3}{2}$).
Fig. 2. Part of stem, antical view (× 50).
Fig. 3. Leaf (× 50).
Fig. 4. Leaf subtending branch (× 50).
Fig. 5. Underleaf (× 50).
Fig. 6. Cells from middle of leaf (× 440).

BLEPHAROSTOMA QUADRIPARTITUM (Hook.) Trevis 46

Fig. 7. Leaf (× 50).
Fig. 8. Perichætial bract (× 50).

EXPLANATION OF PLATE V.

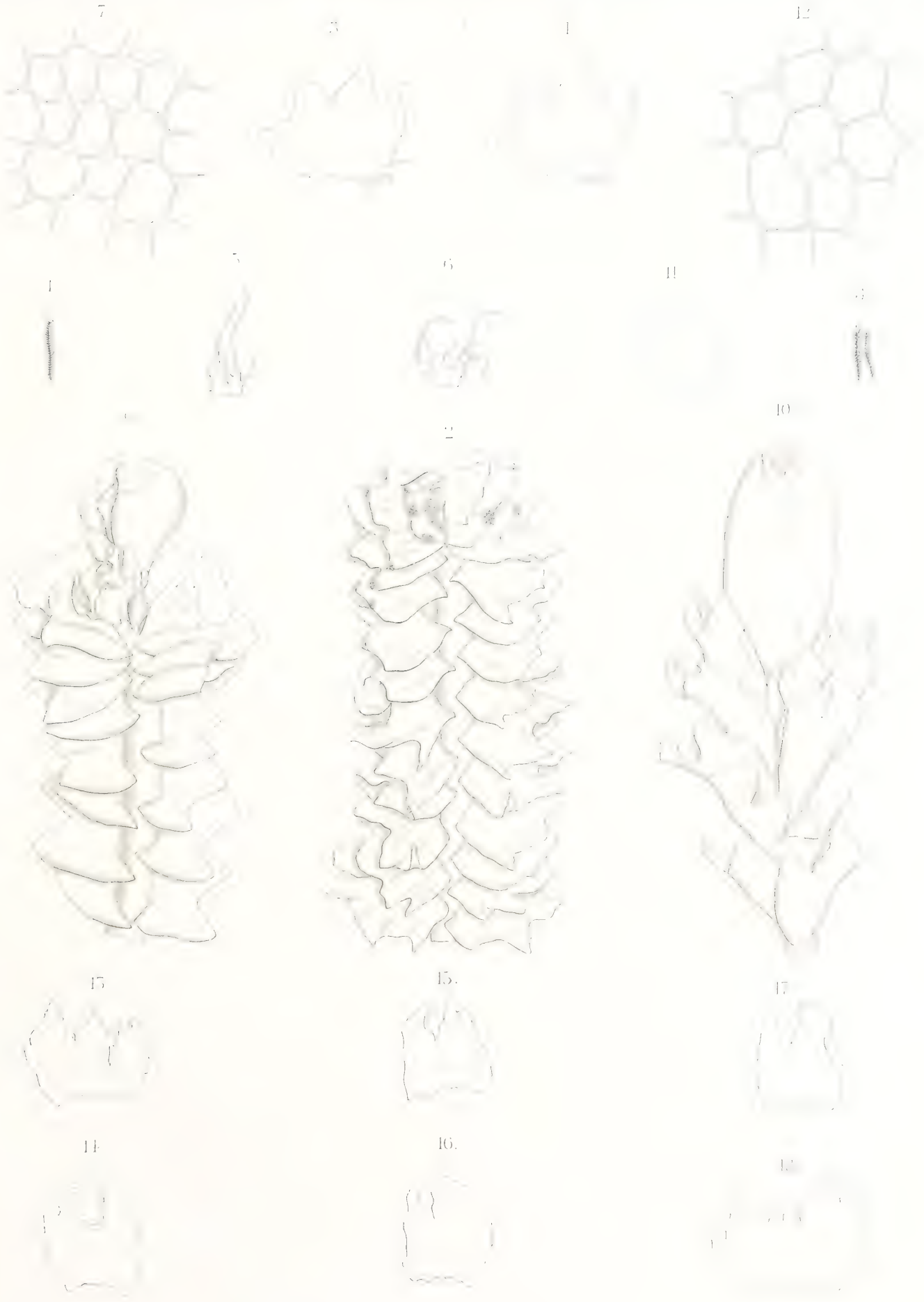
PAGE

JUNGERMANNIA HATCHERI Evans 45

Fig. 1. Plant (× $\frac{4}{3}$).
Fig. 2. Part of gemmiparous stem, antical view (× 20).
Figs. 3, 4. Leaves (× 16).
Figs. 5, 6. Underleaves (× 28).
Fig. 7. Cells from middle of leaf (× 250).

JUNGERMANNIA PROPAGULIFERA Gottsche 46

Fig. 8. Plants, natural size.
Fig. 9. Part of stem with male and female inflorescence, antical view (× 20).
Fig. 10. Part of stem, with perianth, antical view (× 16).
Fig. 11. Leaf (× 20).
Fig. 12. Cells from middle of leaf (× 250).
Figs. 13, 14. Innermost perichætial bracts, 13 with connate bracteole (× 16).
Fig. 15. Bract of next outer row (× 16).
Figs. 16, 17. Perigonial bracts (× 16): 13–17 from one inflorescence.
Fig. 18. Innermost perichætial bracts with connate bracteole between them, from another inflorescence (× 16).



A. W. Evans del.

EXPLANATION OF PLATE VI.

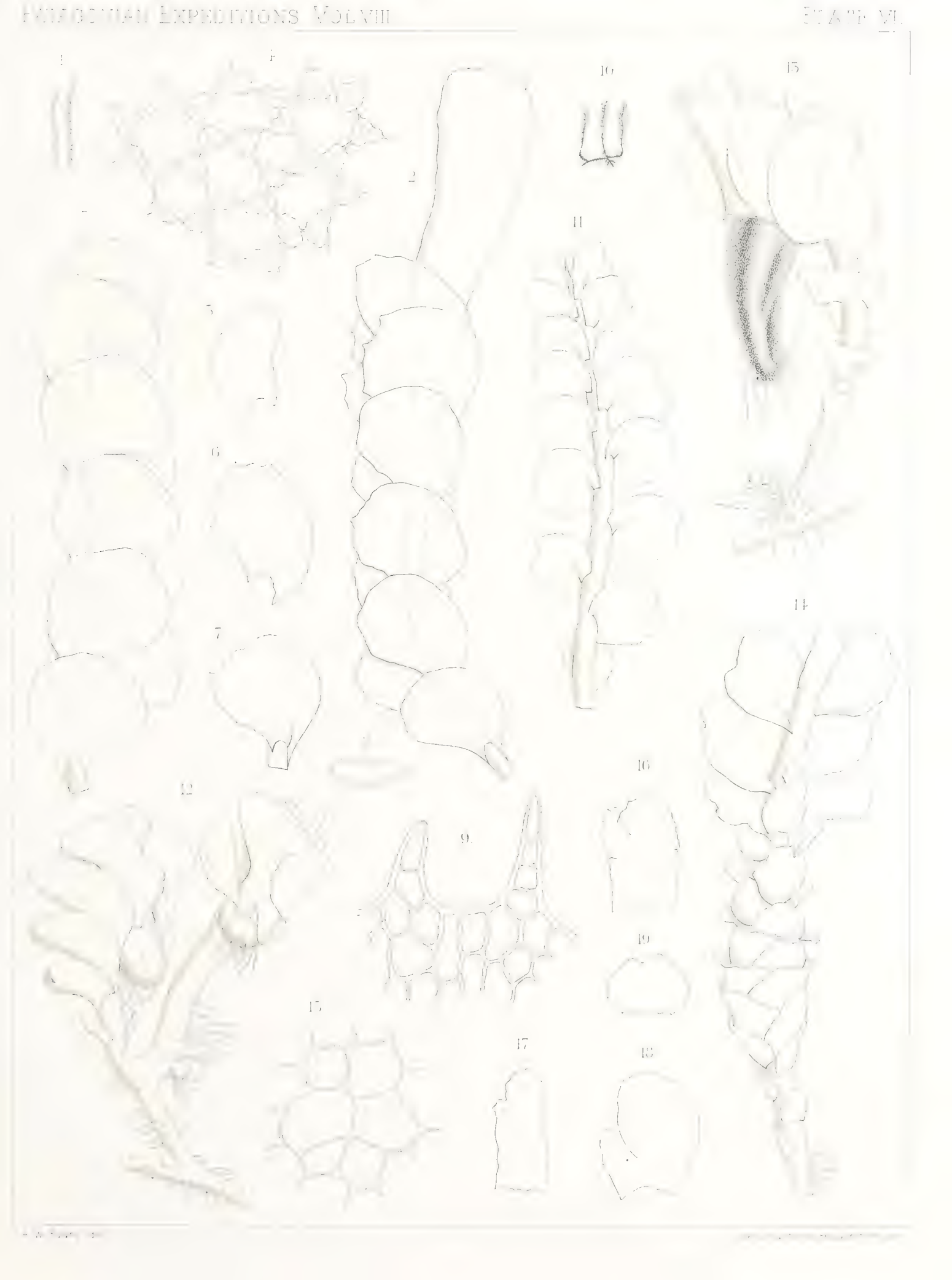
PAGE

PLAGIOCHILA ANSATA Hook. f. & Tayl. 54

Fig. 1. Plants, natural size.
Fig. 2. Part of stem, with perianth, lateral view (× 15).
Fig. 3. Part of sterile stem, lateral view (× 15).
Fig. 4. Cells from middle of leaf (× 290).
Figs. 5, 6, 7. Bracts, in regular order from perianth (× 15).
Fig. 8. Transverse section of perianth (× 18).
Fig. 9. Teeth from mouth of perianth (× 290).

TYLIMANTHUS ANDERSSONII (Ångstr.) Evans. 56

Fig. 10. Plants, natural size.
Fig. 11. Sterile stem, postical view (× 12).
Fig. 12. Female stem with two young sacs (× 12).
Fig. 13. Female stem, with mature sac (× 12).
Fig. 14. Male stem, antical view (× 12).
Fig. 15. Cells from middle of leaf (× 220).
Figs. 16, 17, 18. Perichætial bracts (× 12).
Fig. 19. Perigonial bract (× 14).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PART III.

PATAGONIAN AND FUEGIAN MOSSES.

BY

P. DUSÉN.

THE mosses collected by Mr. J. B. Hatcher in South America in the years 1896 and 1897 are mostly from the district around the sources of the Rio Chico (in about 48° S. L.) on the eastern slope of the Patagonian Cordillera. Some were collected in the vicinity of Punta Arenas on the north side of the Straits of Magellan, others in the southern part of Tierra del Fuego, at Ushuaia, Lapataia and Villarino; but from the Patagonian east coast there is only one species, though a new one, *Hypnum perplicatum*. In not a few cases no particulars are given of habitations and conditions, under which the different species are living.

This collection, though not a very comprehensive one, is of great interest, partly because it was brought together from a district, the Rio Chico territory, which has been very seldom visited by naturalists and from which, as far as I am aware, no bryological collections were previously derived. Altogether the Hatcherian mosses number 71 species, of which no less than 24 are entirely new to science.

Long ago C. Müller Hal. pointed out the striking similarity existing between the moss-vegetation of Patagonia and Tierra del Fuego on the one side, and that of Kerguelen Island, Tasmania, Auckland Island, Campbell Island, New Zealand and Australia on the other. The districts enumerated not only exhibit species of a very close affinity, but even many identical species, a fact which is well confirmed by Hatcher's collection, although it scarcely contains one third of the number of mosses from the Fuegian territory, that are known to me. The following Hatcherian species, not counting such as should be considered cosmopolitan, are common to all or some of the above districts, namely: *Dicranum billardieri* Schwaegr., *Dicranum robustum* Hook. fil. et Wils., *Campylopus introflexus* (Hedw.) Mitt., *Polytrichadelphus magellanicus* (L.) Mitt.,

Catagonium politum (Hook. et Wils.) C. Müll., *Rhacomitrium lanuginosum* (Hedw.) Brid., *Rhizogonium mnioides* (Hook.) Sch., and *R. subbasilare* (Hook.) Sch., *Bryum bimum* Schreb., *Leptobryum pyriforme* (Hedw.) Sch., *Webera cruda* (L.) Schwaegr., *Distichium capillaceum* (L.) Br. Eur., *Aulacomnium palustre* (L.) Schwaegr., *Orthotrichum rupestre* Schleich., *Lepyrodon lagurus* (Hook.) Mitt. and *L. implexus* (Kze.) Par., and *Brachythecium paradoxum* (Hook. fil. et Wils.) Besch.

Apart from new species, nearly one third of Hatcher's mosses are also found outside of the district now in question, in other temperate parts of the southern hemisphere.

The affinity above alluded to likewise exists between the moss vegetation of Patagonia and Tierra del Fuego and that of the temperate districts of the northern hemisphere, although the number of common species in this case is not so large as in the other. The following Hatcherian mosses belong also to the temperate zone north of the equator, namely: *Campylopus introflexus* (Hedw.) Mitt., *Rhacomitrium lanuginosum* (Hedw.) Brid., *Bryum bimum* Schreb., *Leptobryum pyriforme* (Hedw.) Sch., *Webera cruda* (L.) Schwaegr., *Distichium capillaceum* (L.) Br. Eur., *Aulacomnium palustre* (L.) Schwaegr., and *Orthotrichum rupestre* Schleich., the two last named being now for the first time reported as natives of Patagonia.

On the other hand, there are not a few species missing, which one would *a priori* except to find in this collection. Many genera and even families, having numerous representatives in the coast districts of Patagonia and the more humid parts of Tierra del Fuego, are either wanting altogether or at the most very scantily represented. The genus *Andreæa*, for instance, which shows a large number of species within the former sections has none at all here, this likewise applying to *Hypopterygium*, *Breutelia* and *Ptychomnium;* the family of *Hookeriaceæ* has not a single representative. Sparingly represented are the genera *Ulota*, *Dicranum* and *Campylopus*, which are elsewhere very rich in species. That so many species characteristic of the region in question and commonly spread at least within its more humid parts, should be wanting in the Hatcher collection, might be explained by the fact of its having been brought together partly at least from a comparatively dry section of the eastern slope of the Cordillera. Thus it is that Hatcher's mosses scarcely even hint at a very interesting feature of the West-Patagonian and Fuegian moss-vegetation,

which has been already accentuated by C. Müller (Hal.), viz: that several genera which, as a rule, are confined to tropical and subtropical regions, are represented here by not a few species. *Hypopterygium*, for instance, displays three species, *Pilotrichella* two, *Cryphæa*, *Dendrocryphæa*, *Daltonia* and *Hookeria* one each, and *Pterygophyllum*, *Muiadelphus* and *Macromitrium* several species. Of Hatcher's mosses only two represent tropical types, *Macromitrium bifasciculare* n. sp. and *Macromitrium tenax* C. Müll. These tropical representatives are almost exclusively to be found in the most westerly part of our district. They follow the coast and reach comparatively high latitudes; a few even extend to Cape Horn. The explanation of this, I think, is to seek in the mild climate of the western coast region.

The occurrence of tropical types within our district, as is well known, is not limited to the mosses exclusively, but also includes the phanerogamic plants. The affinity spoken of above between the moss-vegetation of our territory and that of Kerguelen Island, New Zealand and Australia is not an exceptional feature, but also prevails among the phanerogamic flora of the several districts, even though it is less marked there than in the mosses.

SPHAGNALES.

Fam. SPHAGNACEÆ.

Gen. SPHAGNUM Dill.

SPHAGNUM FIMBRIATUM Wils. var. ROBUSTUM Braithw.

Hab. Patagonia australis.

SPHAGNUM MEDIUM Limpr. var. FUSCO-RUBELLUM Warnst.
f. BRACHYDASYCLADA Warnst.

Hab. Patagonia australis.

BRYALES.

ACROCARPINEÆ.

Fam. DICRANACEÆ.

Subfam. *DICRANELLEÆ*.

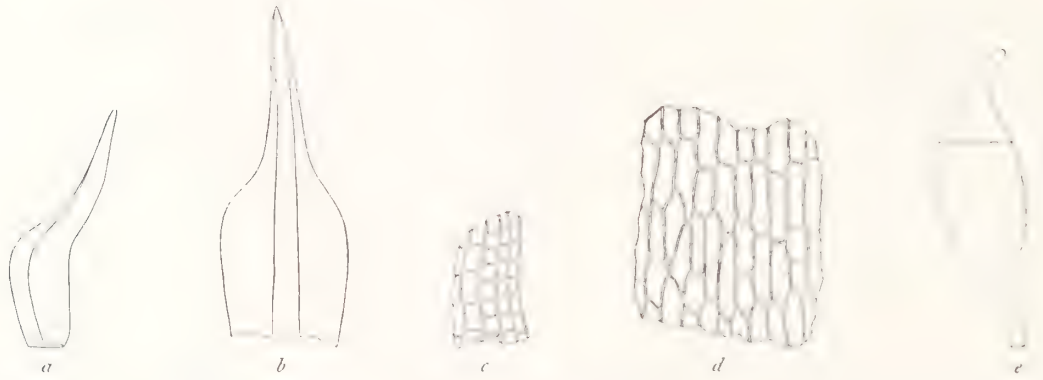
Gen. ANISOTHECIUM Mitt.

Anisothecium perpusillum Dusén n. sp.

Pl. VII, Figs. 1, 2.

Dioicum; dense cæspitosum, cæspitibus paulum cohærentibus, lutescente viridibus, haud nitidis; *caulis* gracilis, erectus, plerumque strictus, simplex vel superne innovando ramulosus, usque ad 2.5 cm. altus, e basi ad medium plus minusque dense rufo-tomentosus, *folia* densiuscule con-

Fig. 1.



Anisothecium perpusillum Dusén. *a*, folium a latere visum, $\frac{32}{1}$; *b*, folium planefactum, $\frac{32}{1}$; *c*, cellulæ apicales, $\frac{200}{1}$; *d*, cellulæ basales, $\frac{200}{1}$; *e*, capsula operculata humiditate, $\frac{18}{1}$.

ferta, rigida, usque ad 1.8 mm. longa et basi (haud planefacta) c. 0.4 mm. lata, e basi erecta patentia, siccitate superne incurvata, humiditate stricta, e basi amplexicauli lata brevique et sursum sublatiori raptim contracta et subulate attenuata, canaliculata, marginibus erectis, integerrimis; *nervo* valido, basi c. 0.09 mm. crasso, concolori, cum apice desinente; *cellulæ* flavo-virides, pellucidæ, firmæ, basales rectangulæ, ceteræ subquadratæ; *bracteæ perichætii* foliis caulinis similes, sed majores, cellulis aureo-brunneis; *seta* erecta, stricta, siccitate dextrorsum torta, sat robusta, usque ad 1 cm. alta, straminea, ætate brunnea; *theca* erecta, stricta, paullum asymmetrica, humiditate breviter ovalis, siccitate breviter subcylindrica, pachyderma, lævissima, brunnea, macrostoma, ore subobliquo; *dentes peristomii* lanceolati, circiter a medio in cruribus binis fissi, rarissime integri et perforati, superne hyalini et lævissimi (?) ceterum flavi et papillosi, papillis longitudinaliter seriatis; *operculum* conicum, oblique rostratum, rostro crasso, theca breviori.

Planta mascula pusilla, c. 5 mm. alta, simplex vel apice plerumque innovationem unicam emittens, foliis ut in planta fem.; flos terminalis

vel ob innovationem pseudolateralis, gemmaceus; bracteæ e basi lata ovalique sat subito contractæ, longe capillari-attenuatæ; paraphyses numerosi, filiformes, flavi.

Hab. Patagonia australis, ubi species verisimiliter in territorio fontinali fluminis Rio Chico lecta est.

Allied to *Anisothecium rufipes* (C. Müll.); differing from that species by the much broader basal part of its leaves, being shorter subulate and quite entire (not crenulate); by the absence of apophysis, and by its much shorter rostrate lid.

Subfam. *DICRANEÆ.*

Gen. DICRANOWEISIA Lindl.

Dicranoweisia perpulvinata Dusén n. sp.

Pl. VII, Figs. 3, 4.

Autoica; densissime pulvinatim cæspitosa, cæspitibus usque ad 6 cm. latis, lutescente viridibus, inferne fuscis; *caulis* sat dense ramosus, apice innovando ramulosus, usque ad 1.5 cm. altus, infima basi solummodo radiculosis; *folia* sicca crispata, humida stricta vel leviter curvata, suberecta, e basi amplexicauli, subdecurrente et fere lineari subulate elongata, usque ad 3.6 mm. longa, canaliculata, integerrima, *nervo* basi 0.05 mm. crasso, infra summum apicem desinente; *cellulæ* basales elongate rectangulæ, alares paucæ, amplæ, quadratæ vel subquadratæ, omnino hyalinæ,

Fig. 2.

Dicranoweisia perpulvinata Dusén. *a*, *b*, folia, $\frac{18}{1}$; *c*, capsula vetusta humiditate, $\frac{18}{1}$; *d*, capsula calyptrata humiditate, $\frac{18}{1}$.

ceteræ rotundate quadratæ, 0.008–0.010 mm. magnæ, vel papillosæ, parietibus incrassatis; *bracteæ perichætii* exteriores foliis caulinis similes, inte-

riores erectæ, convolutæ, apice cito contractæ, breviter acutatæ, nervo infra apicem evanido, cellulis anguste elongatis, parietibus valde incrassatis, apicalibus ceteris multo brevioribus; *seta* erecta stricta c. 1 cm. alta, siccitate sinistrorsum torta, flavo-brunnea; *theca* oblongo-ovalis, c. 1.8 mm. longa et 0.6 mm. crassa, pallide brunnea, leptoderma macrostoma, siccitate longitudinaliter subrugosa; *annulus* nullus; *dentes peristomii* 16, subulati, c. 0.163 mm. alti et basi 0.03 mm. lati, remote trabeculati, trabeculis c. 7 sat crassis, inferne aurantiaci et lævissimi, superne pallidiores, fere hyalini et minutissime papillosi, apice haud fissi; *operculum* conicum, oblique rostratum, rostro theca subæquilongo; *sporæ* 0.016–0.020 mm. magnæ, lævissimæ.

Hab. Patagonia australis.

Closely resembling *Dicranoweisia crispula* (Hedw.) Lindb. and nearly allied to that species, scarcely differing save in its peristome, the teeth of which are shorter and more slender than in the aforenamed species. It is also remotely trabeculated and papillose only in its upper part, sometimes nearly quite glabrous.

From *Dicranoweisia austro-crispula* (C. Müll.) Par. it differs, to judge from the diagnosis, by its shorter and oval capsule and its shorter and more rigid leaves.

Nearly related also to *Dicranoweisia antarctica* (C. Müll.) Par., differing from that species by the middle and upper round-quadrate cells of its leaves.

Gen. DICRANUM Hedw.

Dicranum billardieri Schwaegr.

Hab. Fuegia australis.

Dicranum nigricaule Aongstr.

Hab. Patagonia australis.

Fuegia australis ad Villarino.

Dicranum robustum Hook. fil. et Wils.

Hab. Fuegia australis.

Dicranum australe Besch.

Hab. Fuegia australis ad Villarino.

Dicranum leucapterum C. Müll.

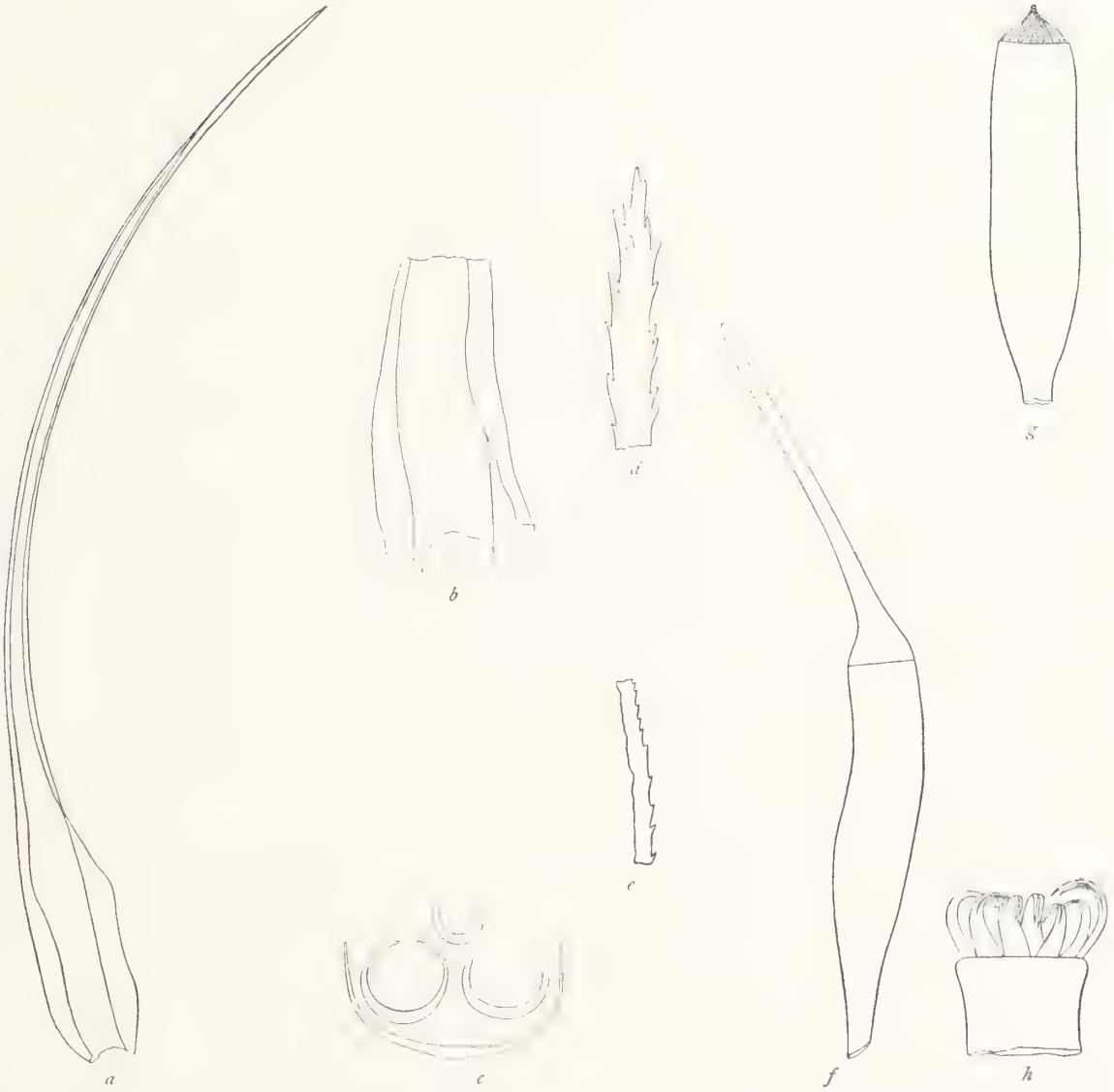
Hab. Fuegia australis.

Dicranum cirrhifolium Schpr. in herb.

Pl. VII, Figs. 5–7.

Dioicum; subintertexte cæspitosum, cæspitibus expansis, haud nitidis, superne viridibus vel lutescente-viridibus, ceterum ferrugineis; caulis plerumque erectus, strictus, omnino 6–7 cm. interdum usque ad 10 cm.

Fig. 3.



Dicranum cirrhifolium Schpr. in herb. *a*, folium (basi defectâ), $\frac{18}{1}$; *b*, pars basalis folii, $\frac{18}{1}$; *c*, sectiones folii, $\frac{32}{1}$; *d*, apex folii, $\frac{142}{1}$; *e*, pars superior marginalis folii, $\frac{142}{1}$; *f*, theca calyptrata humiditate, $\frac{18}{1}$; *g*, theca deoperculata humiditate, $\frac{18}{1}$; *h*, pars suprema capsulæ deoperculatæ siccitate, $\frac{32}{1}$.

altus, simplex vel parce furcatus, summitate innovando ramulosus, rigidus, robustus, fere usque ad apicem ferrugineo-tomentosus; *folia* densa, siccitate suberecta, suprema interdum subuncinata, flexuosa vel plerumque cirrhata, medio apiceque plana, humiditate e basi erecta patentia, stricta vel leviter arcuate recurvata, vix decurrentia, excavate subauriculata, auriculis in tomento occultis, e basi lata, oblonga, amplexicauli raptim contracta, longissime capillari-attenuata, usque ad 11 mm. longa et basi 1 mm. lata, canaliculata, superne interdum subconvoluta, marginibus basi medioque integerrimis, apicem versus serrulatis, summitate serratis, *nervo* valido, dilatato haud bene limitato, basi c. 0.54 mm. lato, longe infra medium folii laminam totam occupante, dorso dense papilloso-scabro; *cellulæ* pallide virides, pellucidæ, angustæ, elongatæ, parietibus interrupte et mediocriter incrassatis, alares numerosæ, distincte limitatæ, nervum attingentes, breviter rectangulæ, hyalinæ vel omnino pallide aureo-brunneæ; *bracteæ perichætii* foliis caulinis multo breviores, erectæ, cylindraceo-convolutæ, superne raptim contractæ, cuspidatæ, anguste nervosæ, nervo excurrente, cuspidem formante, cellulis angustis, elongatis, lævissimis; *setæ* singulæ binæve, erectæ, strictæ tenues, 2–3 cm. altæ, flavo-brunneæ; *theca* cylindrica, erecta, stricta, c. 3 mm. longa et 0.7 mm. crassa, olivacea, lævissima, ætate avellanea et haud rare plus minusque sulcata, siccitate paulum sub ore constricta; *dentes peristomii* rubri, 0.5 mm. alti et basi 0.075 mm. lati, longe infra medium in cruribus binis, rarissime ternis, filiformibus fissi, superne nodulosi, papilloso-scabri, inferne longitudinaliter denseque papilloso-striati, papillis minutissimis, lamellis 6–9, validis; *operculum* convexe conicum, subulate rostratum, rostro theca æquilongo vel longiori, maturitate curvato; cetera ignota. Hab. Patagonia australis in territorio fontinali fluminis Rio Chico, ubi ad basin *Nothofagi pumilionis* (Poepp. et Endl.) Blume, occurrit.

An excellent species, most nearly allied to *D. laticostatum* Card., differing from that species in its shorter stem, in the dry state its curled leaves, straight capsule, etc.

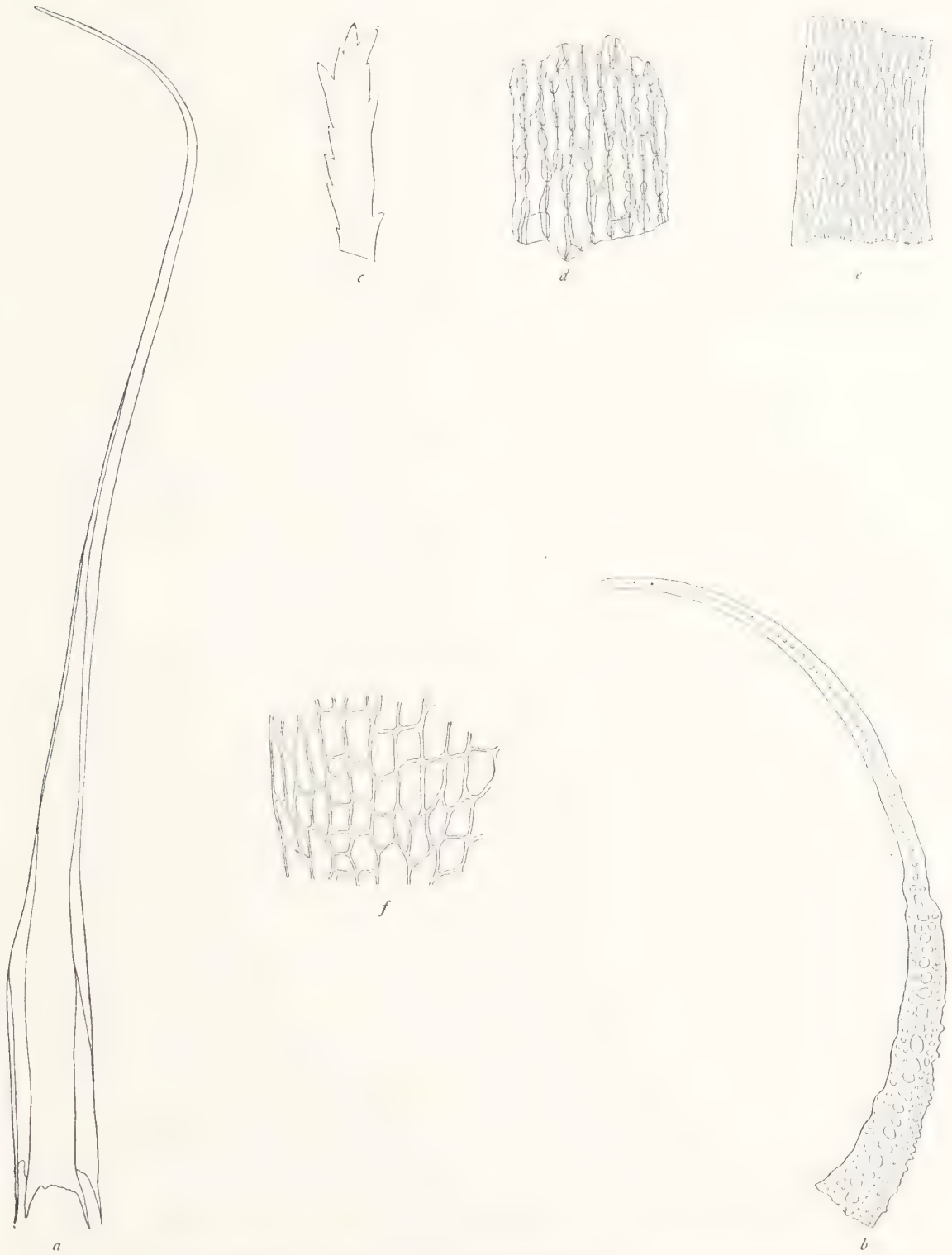
Dicranum scaberrimum Dus.

Pl. VIII, Fig. 1.

Syn. *Campylopus scaberrimus* Broth. in sched.

Dense cæspitosum, sordide flavum, fere longitudine tota dense ferrugineo-tomentosum, usque ad 1 dm. altum; *caulis* strictus, erectus, sim-

FIG. 4.



Dicranum scaberrimum Dus. *a*, folium, $\frac{18}{1}$; *b*, secto folio, $\frac{162}{1}$; *c*, apex folii, $\frac{200}{1}$; *d*, cellulæ basales, $\frac{200}{1}$; *e*, cellulæ alares, $\frac{200}{1}$; *f*, cellulæ superiores folii.

plex vel superne furcatus vel raro in ramulos paucos erectos divisus; *folia* sicca erecta, apice plus minusque arcuata vel rarissime subflexuosa, comalia sæpe subuncinata, humida erecta, fere stricta, usque ad 15 mm. longa et basi (planefacta) 2 mm. lata, linearilanceolata, haud auriculata, sensim longe subulate attenuata, subdecurrentia, marginibus apice sparsim serrulatis, ceterum integerrimis, costa latissima, depressa, basi 0.45–0.50 mm. lata, subulam totam occupante, dorso dense papillosa; *cellulæ* alares haud inflatæ, aureo-flavæ, indistincte limitatæ, subrectangulæ, cellulis basalibus paulo breviores, parietibus æqualiter subincrassatis; cellulæ basales subrectangulares, parietibus interrupte valde incrassatis; *superiores* subovales, rotundate quadratæ vel rotundate rectangulares; *marginales* angustæ, lineares; cetera ignota.

Dr. V. F. Brotherus has had the kindness to send me a specimen of a moss, collected many years ago by Cunningham in the surroundings of Sandy Point (Punta Arenas) on the Straits of Magellan. This plant, agreeing exactly with the one above described, was determined as *Campylopus scaberrimus* n. sp. According to my opinion it is, however, more correct to refer it to the genus *Dicranum* than to the genus *Campylopus*. It contains, however, only a single character, which shows the place of the plant to be amongst the Dicrana, namely the structure of the nerve. A transverse section of the leaves a little above their base shows the nerve to be composed of a middle row of wide cells, enclosed by some few rows of very small ones, as is the case with *Dicranum orthocomum* (Besch.) C. Müll., which also was previously placed in the genus *Campylopus*.

Dr. Brotherus, as well as myself, having taken notice of the preliminary report of the mosses, brought home by the Belgian Antarctic Expedition and published by Dr. J. Cardot in "Revue Bryologique," 1900, supposed the *Dicranum scaberrimum* to be identical with the *Dicranum laticostatum* Card. This supposition, however, proved incorrect. Having received the accurate description of the above-mentioned antarctic mosses, given by Cardot in the scientific report of the Belgian Antarctic Expedition, it was found at once that the two mosses in question are not identical, and that the *Dicranum scaberrimum* was an undescribed species.

It shows some characters of *Dicranum laticostatum* Card. as the broad, depressed nerve, being papillous on the dorsal side. It clearly differs, however, from that species in its longer and more robust stem, being also tomentose more densely and higher up, in its larger and erect

FIG. 5.

Dicranum dicranellatum Dusén. *a*, folium, $\frac{18}{1}$; *b*, bracteæ perichætii, $\frac{18}{1}$; *c*, capsula operculata humiditate, $\frac{18}{1}$; *d*, flos masculus, $\frac{18}{1}$.

leaves and in its uninflated and scarcely distinct alar cells. From *Dicranum rigens* Besch. it is distinguished by its papillous nerve and its alar cells. It appears to stand nearest to *Dicranum orthocomum* (Besch.) C. Müll., but differs from that species in its more robust stem which is nearly in its whole length densely tomentose, and in its much longer and more erect leaves, being all papillous on the dorsal side of the nerve.

Dicranum dicranellatum Dusén n. sp.

Pl. VIII, Figs. 2, 3.

Autoicum; dense vel interdum laxe cæspitosum, cæspitibus plerumque parvis, humilibus, lutescente viridibus, vel nitidis, inferne ferrugineis; *caulis* erectus vel adscendens, 2–3 cm. altus, simplex vel basi pauci-ramosus, summitate brevissime ramulosus, gracilis, fere ad apicem ferrugineo-tomentosus; *folia* densa, siccitate suberecta, strictiuscula vel plus minusve arcuata, suprema interdum subuncinata, humiditate patentia, strictiuscula vel leviter recurvata, e basi lineari-oblonga sensim longe capillari-attenuata, usque ad 10 mm. longa et basi 0.45 mm. lata, canaliculata, marginibus integerrimis vel apice solummodo serrulatis, *nervo* valido, lævissimo, basi c. 0.2 mm. lato, totam partem supremam folii occupante; *cellulæ* basales elongatæ, parietibus interrupte incrassatis, ceteræ ovales vel rotundatæ, alares amplæ, subquadratæ vel breviter subrectangulæ, distincte limitatæ, nervum attingentes, aureo-brunneæ; *bracteæ perichætii* erectæ, cylindracco-convolutæ, superne raptim contractæ et capillari-attenuatæ, tenuiter nervosæ, nervo percurrente, cuspidem formante, cellulis elongatis, parietibus interrupte incrassatis; *seta* erecta, stricta, tenuis, 2–2.5 cm. alta, flavidula; *theca* cylindrica, stricta, lævissima, olivacea, vetusta pallide brunnea, c. 2 mm. longa et 0.5 mm. diam., siccitate sub ore paulum constricta; *peristomii dentes* rubri, 0.5 mm. alti et basi 0.06 mm. lati, ultra medium in cruribus binis fissis, superne subnodulari- et papilloso-scabri, inferne obsolete plicato-striati, lamellis c. 10, validis; *operculum* conicum, oblique rostratum, rostro theca fere acquilongo; cetera ignota.

Flores masculi paulum infra florem fem. dispositi, gemmiformes, in tomento occulti; folia perigonalia e basi concava, suborbiculari longe capillari-attenuata.

Hab. Fuegia australis ad Villarino.

Near to *Dicranum macropus* Kze. but differing by its completely glabrous leaf-nerve and its erect capsule.

Subfam. *DITRICHEÆ.*

Gen. DITRICHUM Timm.

Ditrichum hyalinum (Mitt.) Par.

Hab. Patagonia australis in territorio fontinali fluminis Rio Chico, ubi ad basin *Nothofagi pumilionis* (Poepp. et Endl.) Blume occurrit.

Gen. DISTICHIUM Br. Eur.

Distichium capillaceum (L.) Br. Eur.

Hab. Patagonia australis in territorio fontinali fluminis Rio Chico in terra; Fuegia australis ad Villarino.

Fam. Pottiaceæ.

Subfam. *POTTIEÆ.*

Gen. POTTIA Ehrh.

Pottia spegazziniana C. Müll.

Hab. Patagonia australis in territorio fontinali fluminis Rio Chico in terra.

Gen. BARBULA Hedw.

Barbula flagellaris Schpr.

Hab. Patagonia australis in territorio fontinali fluminis Rio Chico in truncis et ad basin arborum.

Barbula fuegiana Mitt.

Hab. Fuegia australis.

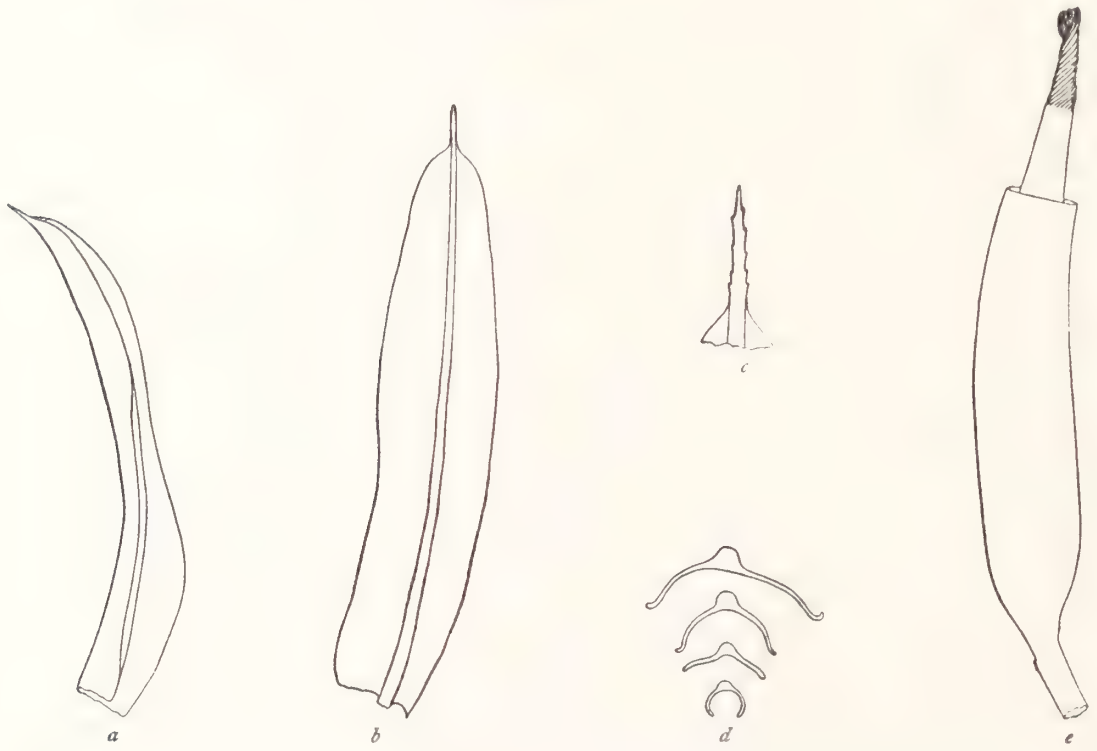
Barbula perrubiginosa Dusén, n. sp.

Pl. VIII, Fig. 4.

Synoica; densiuscula cæspitosa, cæspitibus sat expansis, summitate sordido-viridibus, ceterum rubiginosis; *caulis* robustus, usque ad 5 cm. altus, dimidio inferiore vel longitudine tota ruforadiculosus, erectus, strictus, plus minusque vel interdum fasciculatim ramosus, apice innovando ramulosus; *folia* usque ad 5 mm. longa et (deplanata) 0.9 mm.

lata, sicca suberecta, conduplicata, marginibus reflexis, plerumque incurvata, suprema etiam subcontorta humida patentia, suprema arcuate reflexa, e basi amplexicauli, haud decurrente lineari, canaliculata, marginibus papilloso-erosulis, e basi ad medium vel altius reflexis; *nervo* rubro, 0.1 mm. lato, dorso præcipue basin versus minute papilloso-scabro, excurrente, aristam rectam, leviter denticulatam vel subglabram formante; *cellulæ* basales elongatæ, rectangulæ, hyalinæ, lævissimæ, ceteræ minutissimæ, c. 0.011 mm. magnæ, omnino subrotundate quadratæ, obscuræ, minutissime denseque papillosæ, parietibus incrassatis; *bracteæ perichætii* foliis caulinis

Fig. 6.



Barbula perrubiginosa Dusén. *a*, folium, $\frac{18}{1}$; *b*, folium planefactum, $\frac{18}{1}$; *c*, apex folii, $\frac{45}{1}$; *d*, sectiones folii, $\frac{32}{1}$; *e*, theca humiditate, $\frac{18}{1}$.

similes. *Seta* c. 1 cm. alta; stricta, purpurea, lævissima, nitida, sinistrorsum torta; *theca* cylindrica, subcurvata, atropurpurea, c. 5 mm. longa et 0.6 mm. crassa, siccitate nitida leviterque rugosa; *annulus* simplex; *peristomium* c. 1.9 mm. altum, tubulosum, tubo 0.63 mm. alto, inferne albescente, superne purpureo, ubique minutissime et densissime papilloso, indistincte tessellato, cruribus filiformibus, liberis, basi vix binatis, 0.013 mm. crassis, purpureis, fere bis contortis, densissime papillosis; *opercu-*

lum alte conicum, breviter apiculatum; *sporæ* olivaceæ, lævissimæ, c. 0.08 mm. magnæ; paraphyses numerosi, aurei, sursum sensim dilatata, cellula conica vel hemisphærica terminata.

Hab. Patagonia australis in territorio fontinali fluminis Rio Chico in truncis ramisque arborum.

Closely related to *Barbula conotricha* Müll.; differing from that species in its more robust stem, in the nerve of the lower part of the leaves being usually papillous on the dorsal side, in its smaller leaf-cells and its non-cohering peristomial branches.

Fam. Grimmiaceæ.

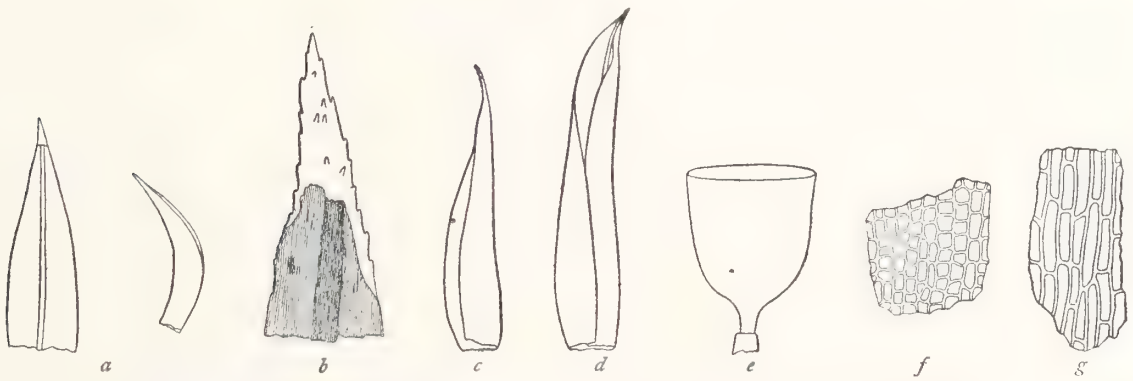
Gen. GRIMMIA Ehrh.

Grimmia fallax Dusén n. sp.

Pl. VIII, Figs. 5, 6.

Autoica, latiuscule pulvinatim cæspitosa, cæspitibus summitate flavidulis, ceterum atro-brunneis; *caulis* usque ad 2.5 cm. longus, gracilis, rigidus, iterum iterumque dichotome et fastigiatim ramosus; *folia* sicca ap-

Fig. 7.



Grimmia fallax Dusén. *a*, folia, $\frac{18}{1}$; *b*, apex folii, $\frac{87}{1}$; *c*, *d*, bracteæ perichætii, $\frac{18}{1}$; *e*, capsula vetusta humiditate, $\frac{18}{1}$; *f*, cellulæ apicales folii, $\frac{200}{1}$; *g*, cellulæ basales, $\frac{200}{1}$.

pressa, madefacta primo reflectentia, deinde recurvate patentia, e basi amplexicauli, haud decurrente, fere lineari oblongo-lanceolata, usque ad 2 mm. longa et 0.45 mm. lata, medio et superne carinata, omnino suprema tantum apice hyalino sat brevi complanato, denticulato, plus minusque decurrente ornata, marginibus integerrimis, usque ad apicem reflexis, *nervo* basi 0.06 mm. crasso, rubro percurrente; *cellulæ* basales rectangulæ,

parietibus strictis, paulum incrassatis, ceteræ omnino quadratæ, c. 0.008 mm. magnæ, parietibus incrassatis subflexuosis, marginales superne saltem bistratosæ; *bracteæ perichætii* foliis caulinis multo majores, flavo-virides, erectæ, subconvolutæ, apice hyalino longiore prædítæ, cellulis in dimidio inferiore bractearum rectangulis, subpellucidis, ceterum foliis caulinis similibus; *seta* brevissima, 0.2–0.35 mm. alta; *theca* brunnea, breviter urnacea, c. 1.1 mm. longa et 0.9 mm. crassa, macrostoma, pachyderma; *cellulæ exothecii* paulum incrassatæ, marginales parvæ, 2–3-seriatæ, transversaliter rotundate subrectangulæ, ceteræ omnino rotundate rectangulæ, rotundate quadratis vel subrotundis mixtæ; *peristomii dentes* aurantiaci, late lanceolati, c. 0.4 mm. alti et 0.14 mm. lati, subobtusi vel acuti, medio et superne hic illic longitudinaliter perforati, interdum apice paulum fissi, dense papillosi graciliterque trabeculati; *operculum* convexum, rostro brevi, crasso, obliquo coronatum; *sporæ* c. 0.013 mm. magnæ, pallide brunneæ, lævissimæ.

Hab. Patagonia australis, ubi verisimiliter in territorio fontinali fluminis Rio Chico in saxis lecta est.

Closely allied to *Grimmia apocarpa* (L.) Hedw., differing in the leaves having narrower basal part, smooth basal cells and shorter broader and complanate apex, in the shorter and broader capsule, in the peristomial teeth being broader in their upper part and usually obtuse, and in the less regular cells of the exothecium.

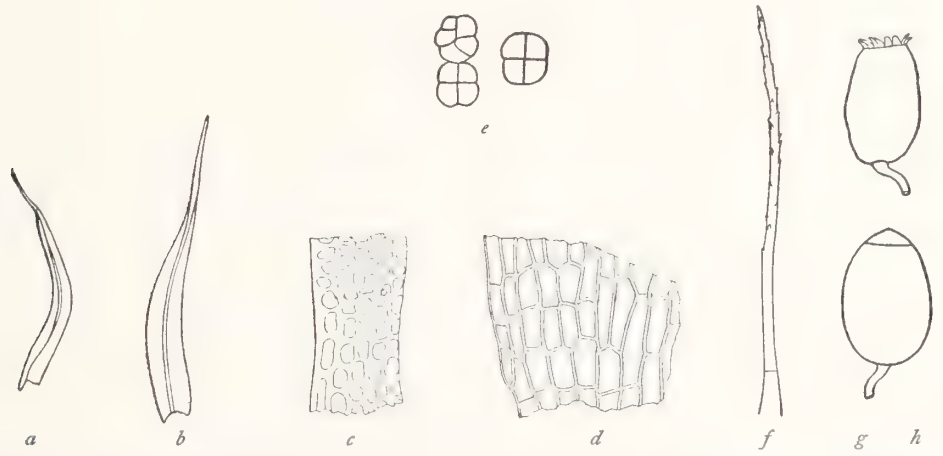
Grimmia macropulvinata Dusén n. sp.

Pl. VIII, Fig. 7.

Autoica; dense pulvinatim cæspitosa, cæspitibus griseoviridibus, usque ad 5 cm. diam., humilibus; *caulis* vix 1 cm. altus, simplex vel dichotome ramosus, haud raro fasciculatim ramulosus, infima basi tantum radiculosus; *folia* densiuscula, usque ad 1.5 mm. longa et 0.4 mm. lata, siccitate appressa, stricta, suprema interdum subspiraliter torta, humiditate patula strictaque, e basi sublineari vel subovali lanceolate elongata, sensim in pilo hyalino, remote denticulato, folio multo breviore, stricte vel interdum subflexuoso producta, canaliculata, apicem versus carinata, marginibus integerrimis, haud reflexis; *nervo* basi c. 0.04 mm. crasso, apicem versus tantum dorso paulum prominente exarata; *cellulæ* basales pellucidæ, vix pachydermaticæ, juxta nervum sitæ rectangulæ, juxta marginem sitæ quadratæ, ceteræ omnino quadratæ, c. 0.008 mm. magnæ, chlorophyllosæ,

obscuræ, parietibus incrassatis; *bracteæ perichætii* erectæ, convolutæ, foliis caulinis fere duplo majores et multo longius hyalino-cuspidatæ, cellulis dimidii inferioris bractearum rectangulis, pellucidis, ceterum foliis caulinis similes; *seta* stricta vel apice subflexuosa, siccitate dextrorsum torta, c. 1.45 mm. alta; *theca* ovalis, c. 1 mm. longa et 0.7 mm. crassa, leptoderma, olivacea, vetusta pallide brunnea, erecta, bracteas vix vel paulum superans siccitate irregulariter subsulcata; *peristomium* rubrum, dentibus siccitate subreflexis, c. 0.22 mm. altis et 0.06 mm. latis, late lanceolatis, apice

FIG. 8.



Grimmia macropulvinata Dusén. *a*, *b*, folia, $\frac{18}{1}$; *c*, cellulæ apicales, $\frac{200}{1}$; *d*, cellulæ basales, $\frac{200}{1}$; *e*, gemmæ, $\frac{200}{1}$; *f*, apex bracteæ, $\frac{45}{1}$; *g*, theca vetusta humiditate, $\frac{18}{1}$; *h*, capsula calyptrata humiditate, $\frac{18}{1}$.

2–4-fissis, trabeculatis, dense papillosis; *operculum* humiliter conicum, haud rostratum; *sporæ* 0.010–0.013 mm. magnæ, lævissimæ.

Flores fem. paraphysibus hyalinis, filamentosis, paucis præditi.

Hab. Patagonia australis, ubi species verisimiliter in territorio fontinali fluminis Rio Chico in saxis lecta est.

Resembling *Grimmia pulvinata* but growing in much larger tufts and well distinguished from that species by the erostrate operculum. Nearly allied also to *G. humilis* Mitt., to judge by the diagnosis, but differing by its upper usually quadrate cells.

Gen. RHACOMITRIUM Brid.

RHACOMITRIUM LANUGINOSUM (Hedw.) Brid.

Hab. Patagonia australis in territorio fontinali fluminis Rio Chico in rupibus.

RHACOMITRIUM LÆVIGATUM (Mitt.) Jaeg.

Hab. speciei; Patagonia australis, ubi verisimiliter in territorio fontinali fluminis Rio Chico lecta est.

Fam. ORTHOTRICHACEÆ.

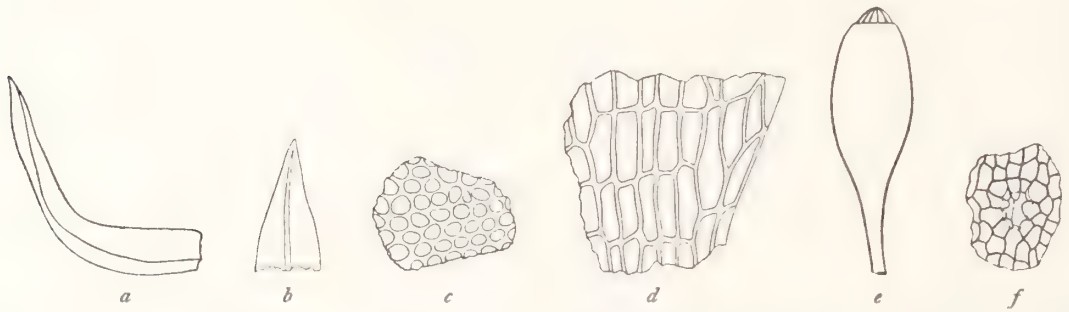
Gen. ORTHOTRICHUM Hedw.

ORTHOTRICHUM MACLOSKII Dusén n. sp.

Pl. VIII, Figs. 8–11.

Autoicum, cryptostomaticum; dense cæspitosum, humillimum, flavo-viride; *caulis* erectus, usque ad 8 mm. altus, fere usque ad apicem rufo-radiculosus; *folia* lineari-lanceolata, siccitate suberecta, stricta, humiditate

FIG. 9.



Orthotrichum macloskii Dusén. *a*, folium, $\frac{18}{1}$; *b*, apex folii, $\frac{45}{1}$; *c*, cellulæ apicales, $\frac{200}{1}$; *d*, cellulæ basales, $\frac{200}{1}$; *e*, capsula humiditate, $\frac{18}{1}$; *f*, cryptostoma, $\frac{87}{1}$.

e basi erecta patentia, usque ad 2.7 mm. longa et 0.5–0.6 mm. lata, superne saltem carinata, marginibus reflexis, papilloso-erosulis, carinate nervosa, *nervo* basi 0.06 mm. crasso, in apicem vix excurrente; *cellulæ* basales rectangulæ, parietibus vix incrassatis, lævissimis, medianæ rotundate subquadratæ, apicales rotundatæ, 0.010–0.014 mm. magnæ, parietibus incrassatis et valde papillosis; *bracteæ*, *perichætii* foliis caulinis similes, sed paulum majores; *seta* brevissima, c. 2 mm. longa et 0.14 mm. crassa; *theca* humiditate ovalis, lævissima, siccitate fere cylindrica, profunde 8-sulcata, 1.5–1.8 mm. longa et 0.6 mm. crassa, plerumque bracteas sat longe superans, flavo-viridis, subnitens, ætate pallide brunnea; *peristomium* pallide flavum, *externum* dentibus 8, bigeminatis, c. 0.25 mm. altis et 0.12 mm. latis, integris, obtusis, dense minutissime

papillosis, siccitate reflexis, ad thecam appressis, *internum* et dentibus perfectis 8 et dentibus rudimentariis totidem præditum, his filiformibus; dentibus peristomii externi paulum brevioribus, laxe nodulosis, lævissimis, basi dilatatis, siccitate arcuatim inflexis, illis humillimis; *membrana basilari* brevissima; *operculum* paulum convexum, pallide flavum, margine aurantiaco, rostro brevi, crasso, subobliquo, rotundate obtuso coronatum; *calyptra* sulcata, glaberrima, aureo-nitens, oblongo-campanulata; *sporæ* 0.016–0.020 mm. magnæ, papillosæ.

Flos masc. gemmiformis ad basin floris fem. dispositus, bracteis ovatis, concavis, subapiculatis, nervo infra apicem evanido, cellulis omnino subrhombeis, lævissimis, parietibus haud vel vix incrassatis.

Hab. speciei, Patagonia australis in truncis arborum, ubi verisimiliter in territorio fontinali fluminis Rio Chico lecta est.

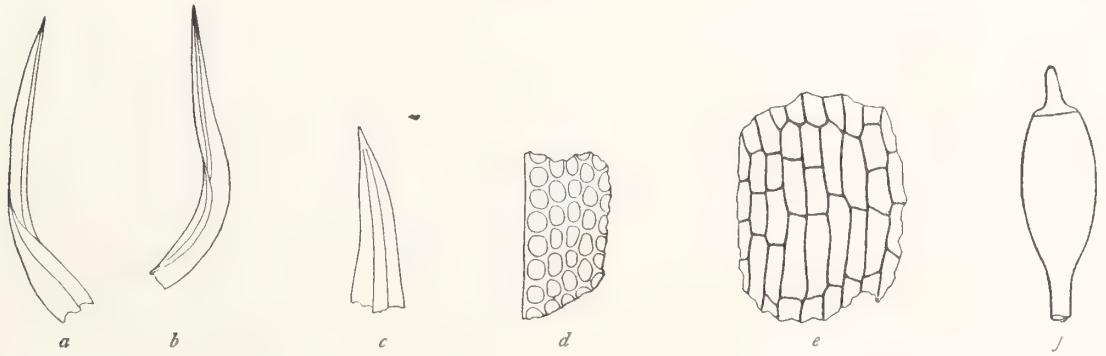
An elegant little species, very distinct and easily recognized by its rudimentary inner peristomial teeth, interposed between the perfect ones, and by its shining hairless calyptra. In size it resembles *Orthotrichum pumilium* Sw. and *tenellum* Bruch.

Orthotrichum compactum Dusén n. sp.

Pl. IX, Figs. 1–3.

Autoicum, cryptostomaticum; densissime et intricate cæspitosum, cæspitibus humillimis, summitate flavo-viridibus, ceterum fuscis; *caulis* erectus, longitudine tota radiculosus, apice ramulosus; folia densissime con-

Fig. 10.



Orthotrichum compactum Dusén. *a*, *b*, folia, $\frac{18}{1}$; *c*, apex folii, $\frac{45}{1}$; *d*, cellulæ apicules, $\frac{200}{1}$; *e*, cellulæ basales juxta nervum sitæ, $\frac{200}{1}$; *f*, capsula calyptrata humiditate, $\frac{18}{1}$.

ferta, lineari-lanceolata, c. 1.8 mm. longa et 0.35 mm. lata siccitate appressa, stricta, humiditate e basi erecta patentia, carinata, marginibus

vulgo planis, rarissime plus minusque reflexis, carinate nervosa, *nervo* basi 0.06 mm. crasso, infra apicem desinente; cellulæ lævissimæ, basales rectangulæ, medianæ rotundate rectangulæ vel rotundate quadratæ, apicales ovales vel rotundatæ, c. 0.013 mm. magnæ, parietibus omnino valde incrassatis; *bracteæ perichætii* foliis caulinis similes; *seta* c. 1.4 mm. alta; *theca* oblonga-ovalis, c. 1.5 mm. longa et 0.55 mm. crassa, siccitate 8-sulcata, pallide flava; *peristomium* pallide flavum, *externum* dentibus 8, bigemmatis, 0.19 mm. altis et basi 0.1 mm. latis, minutissime papillosis, siccitate valde reflexis, ad thecam appressis, *internum* dentibus 8, dentibus endostomii æquilongis, subulatis, lævissimis; *operculum* depresse conicum, rostro crasso, diametro capsulæ breviore, recto, obtuso coronatum; sporæ c. 0.016 mm. magnæ, papillosæ.

Hab. speciei, Patagonia australis in truncis arborum, ubi verisimiliter in territorio fontinali fluminis Rio Chico lecta est. Resembling *Orthotrichum macloskii* Dusén, but more densely tufted, differing from that species by the absence of rudimentary inner peristomial teeth, interposed between the perfect ones, and by the non-papillose cells of the leaves.

ORTHOTRICHUM RUPESTRE Schleich.

Hab. Patagonia australis in territorio fontinali fluminis Rio Chico, ubi in consortio *Barbulæ flagellaris* Schpr. ad basin arborum occurrit.

Gen. ULOTA.

ULOTA HAMATA Dusén n. sp.

Pl. IX, Fig. 4.

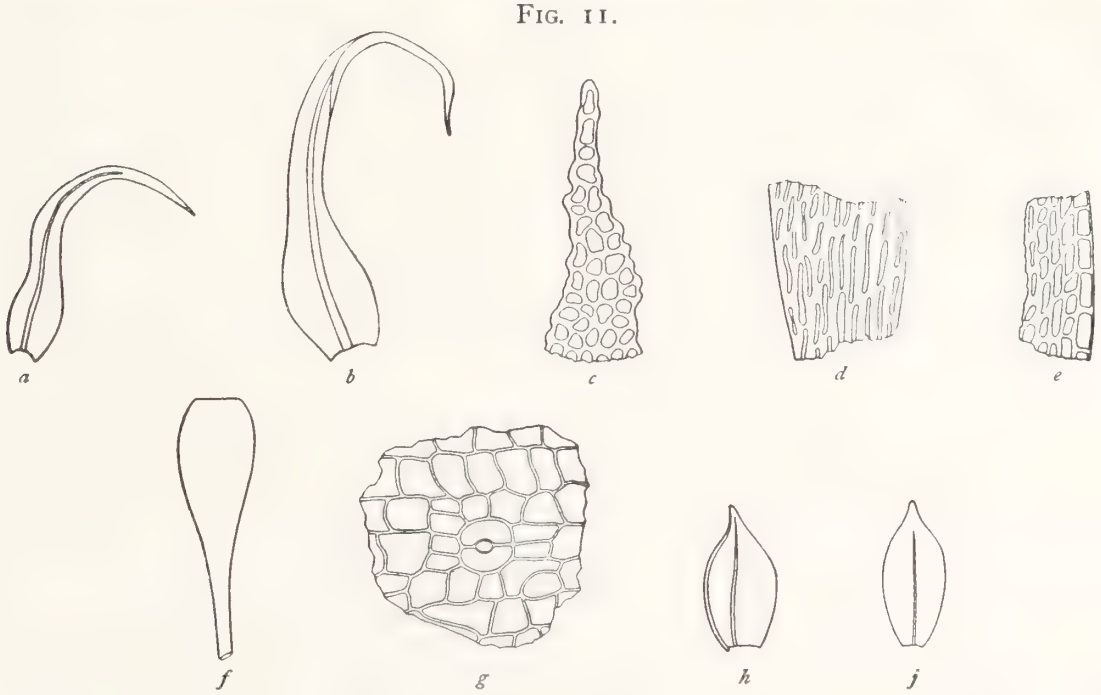
Autoica, phanerostomatica; dense cæspitosa, humilis, lutescente viridis; *caulis* repens, sat dense ramosus, rami erecti plerumque simplices, usque ad 6 mm. alti; *folia* dense conferta, subuncinati, omnino apice hamata, siccitate erecta vel suberecta, vix crispata, humiditate patentia, c. 1.8 mm. longa et basi 0.33 mm. lata, e basi dilatata, breviter ovali, concava elongate lanceolata, subcanaliculata, emarginata, marginibus planis, plus minusque distincte crenulatis; *nervo* basi 0.02 mm. crasso, longe infra apicem evanido; *cellulæ* parietibus valde incrassatis, pellucidæ, basales anguste elongatæ, marginem versus breviter rectangulæ, ceteræ rotundatæ, c. 0.135 mm. magnæ, subpapillosæ; *bracteæ perichætii* foliis caulinis similes, sed paulum majores; *seta* stricta, usque ad 5 mm. alta; *theca* (vetusta) humiditate

clavata, c. 1.4 mm. longa et 0.6 mm. crassa; *calyptra* juventute rubella, pilis hyalinis appressis vestita; cetera ignota.

Hab. Patagonia australis in truncis arborum.

Nearer to *Ulota fulvella* Mitt. than *Ulota fuegiana* Mitt., differing in its

FIG. 11.



Ulota hamata Dusén. *a*, folium, $\frac{32}{1}$; *b*, folium peribracteale, $\frac{32}{1}$; *c*, apex folii, $\frac{200}{1}$; *d*, cellulæ basales, $\frac{200}{1}$; *e*, cellulæ marginales e parte basali, $\frac{200}{1}$; *f*, theca vetusta humiditate, $\frac{17}{1}$; *g*, phanerostoma, $\frac{200}{1}$; *h*, *j*, folia perigonialia, $\frac{32}{1}$.

hamate leaves, being neither twisted nor crisp in the dry state, in its clavate capsule and reddish calyptra with appressed hyaline, inarticulated hairs.

ULOTA FULVELLA Mitt.

Hab. Fuegia australis ad Lapataia et ad Villarino in ramulis.

Gen. MACROMITRIUM Brid.

MACROMITRIUM TENAX C. Müll.

Hab. Fuegia australis.

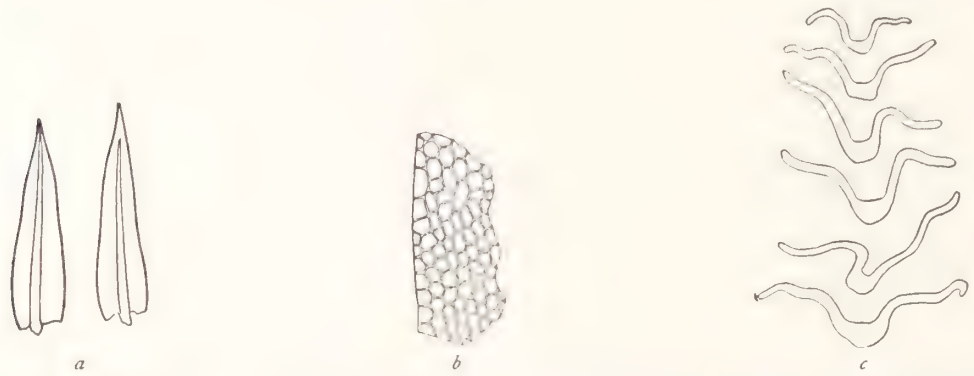
MACROMITRIUM BIFASCICULARE C. Müll. in herb.

Pl. IX, Fig. 5.

Dense cæspitosum, cæspitibus expansis, summitate flavescentibus, ceterum atro-rubiginosis; *caulis* repens, dense ramosus, ramis erectis,

robustiusculis, strictis parallele confertis, usque ad 3.5 cm. altis, iterum iterumque bifurcatis vel apice saltem fasciculatim et fastigiatim ramulosis; *folia* dense conferta, usque ad 2.4 mm. longa et 0.45 mm. lata, siccitate appressa, suprema subspiraliter torta, humiditate patula, imbricata, stricta, lanceolata, acutissima, integerrima, haud decurrentia, carinata, plerumque utroque latere subplane replicata, marginibus planis vel rare subreflexis, *nervo* rubro, valido, basi 0.06 mm. crasso, lævissimo, cum apice desinente; cellulæ lævissimæ, parietibus valde incrassatis, basales rectangulæ, apicales minutissimæ, 0.005–0.008 mm. magnæ, omnino hexagonæ; cetera ignota.

FIG. 12.



Macromitrium bifasciculare C. Müll. *a*, folia, $\frac{17}{1}$; *b*, cellulæ apicales, $\frac{200}{1}$; *c*, sectiones foliorum, $\frac{87}{1}$.

Hab. Fuegia australis ad Villarino in rupibus litoreis (?).

Nearest to *Macromitrium saddleanum* Besch., but much lower, more densely tufted and with denser ramification, besides differing from that species in its non-decurrent leaves and its excurrent leaf-nerve. The upper cells, originally hexagonal, are in the older leaves by hard incrassa- of the membranes very small, oval or nearly round.

Gen. ZYGODON Hook. et Tayl.

ZYGODON CURVICAULIS Dusén n. sp.

Pl. IX, Figs. 6, 7.

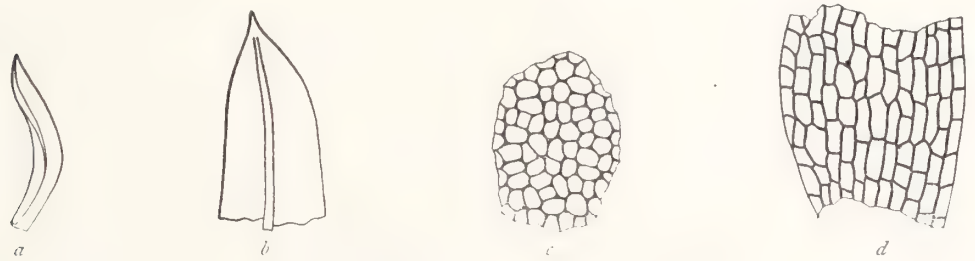
Plus minusque dense cæspitosus, cæspitibus parvis, lutescenti-viridibus, humillimis; *caulis* gracilis, usque ad 1.5 cm. altus, erectus vel adscendens, plerumque vage curvatus, apice haud rare subuncinatus, simplex vel parce ramosus, tota longitudine radiculosus, radiculis atropurpureis, minutissime papillosis, illis, qui ex axillis excedunt lævissimis et brevissimis, gemmis

ovalibus vel subclavatis terminatis; folia siccitate suberecta, incurvata, marginibus subreflexis, suprema saltem plerumque subsecunda, madefacta raptim reflectentia, e basi erecta subsquarrose reflexa, usque ad 1.6 mm. longa et 0.4 mm. lata, lineari-lanceolata, carinata, marginibus planis vel subrecurvatis, papillis vestitis, itaque crenulato-erosulis, nervo basi 0.06 mm. crasso, rubro, infra summum apicem evanescente, lævissimo; *cellulæ* basales breviter rectangulæ, subpellucidæ, ceteræ omnino rotundatæ, minutissimæ, c. 0.013 mm. magnæ obscuræ, utroque latere dense papillosæ; cetera ignota.

Hab. species Patagonia australis in truncis arborum, ubi verisimiliter in territorio fontinali fluminis Rio Chico lecta est.

Nearly related to *Zygodon brownii* Schwaegr. and of quite the same appearance as that species. There is very little difference between the

FIG. 13.



Zygodon curvicaulis Dusén. *a*, folium, $\frac{17}{1}$; *b*, folium planefactum, $\frac{17}{1}$; *c*, cellulæ apicales, $\frac{200}{1}$; *d*, cellulæ basales, $\frac{200}{1}$.

sterile plants of both species. *Zygodon curvicaulis* has perhaps less crowded and a little less acute leaves than *Z. brownii*. The most considerable difference, however, is shown by the gemmæ. The *Z. curvicaulis* has oval or subclavate ones, with transverse membranes of the cells, and disposed at the end of *radicels*, or arising from the axils. The gemmæ of *Z. brownii* on the contrary are quite globular with radiate cell-membranes and seem to have their origin from the lower part of the leaf-nerve.

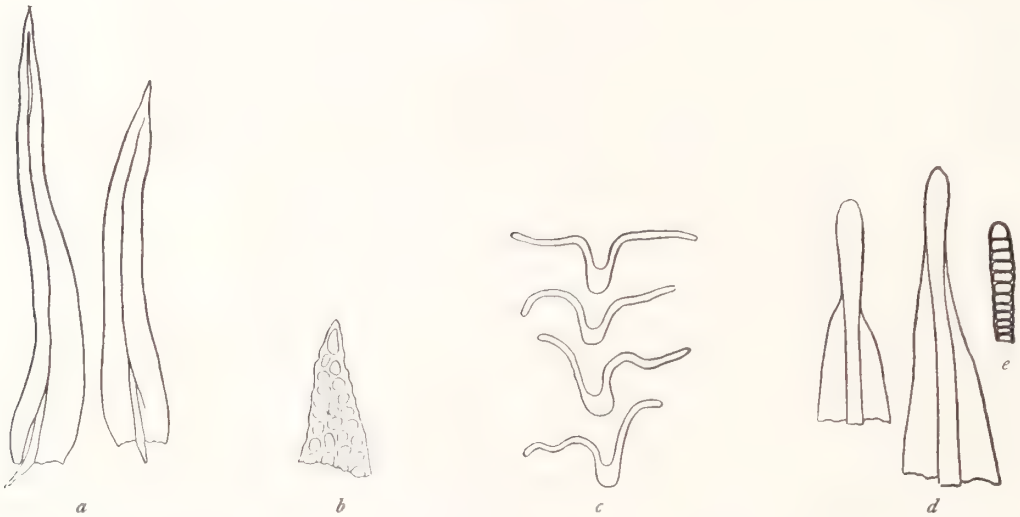
Resembling also *Zygodon intermedius* Br. et Schpr., but differs in its more robust and papillous rhizoides. The fruiting plant will probably give other differing characteristics.

ZYGODON HATCHERI Dusén n. sp.

Pl. IX, Figs. 8, 9.

Dioicus (?); densiuscule pulvinatim cæspitosus, sordido-viridis; *caulis* erectus, strictus, usque and 2 cm. altus, inferne defoliatus vel foliis marcidis plus minusque fragmentariis obtectus, fere tota longitudine radiculosus radiculis atropurpureis, lævissimis, simplex vel parce bifurcatus, summitate ob

FIG. 14.



Zygodon hatcheri Dusén. *a*, folia, $\frac{18}{1}$; *b*, apex folii, $\frac{200}{1}$; *c*, sectiones, foliorum, $\frac{62}{1}$; *d*, apices foliorum, $\frac{47}{1}$; *e*, gemma, $\frac{87}{1}$.

innovationes tumescens; *folia* sursum sensim majora et densiora, siccitate suberecta, crispata, madefacta raptim reflectentia, denique patula et stricta, lanceolata, usque ad 3.5 mm. longa et 0.7 mm. lata, acutissima, percarinata, omnino uno latere, interdum utroque latere genuflexa, marginibus planis, integerrimis vel apicem versus subcrenulatis, nervo basi 0.05–0.06 mm. crasso, vel infra apicem evanido vel excurrente, parte excedente subtumido; *cellulæ* basales lævissimæ, parietibus incrassatis, ad nervum sitæ anguste elongatæ, ad marginem sitæ multo breviores, fere quadratæ, ceteræ dorso subpapillosæ, parietibus valde incrassatis, 0.008–0.011 mm. magnæ, medianæ subangulatæ, apicales omnino rotundatæ; cetera ignota.

Hab. speciei Patagonia australis, ubi verisimiliter in territorio fontinali fluminis Rio Chico lecta est.

A very distinct species, marked by its leaves, crisp in the dry state, and especially by its excurrent leaf-nerve, tumid in its uppermost part.

It can scarcely be doubted that the numerous cylindrical gemmæ, composed each of 4–8 uniseriate cells, which were found in the tufts, belong to the plant and were originally situated on the excurrent part of the leaf-nerve.

Fam. Funariaceæ.

Gen. FUNARIA Schreb.

Funaria hygrometrica (L.) Hedw.

Hab. Fuegia australis ad Lapataia in terra.

Fam. Bryaceæ.

Gen. LEPTOBRYUM Schpr.

Leptobryum pyriforme (L.) Schpr.

Hab. Patagonia australis in territorio fontinali fluminis Rio Chico in paludosis.

Leptobryum pottiaceum Dusén n. sp.

Pl. IX, Figs. 10–12.

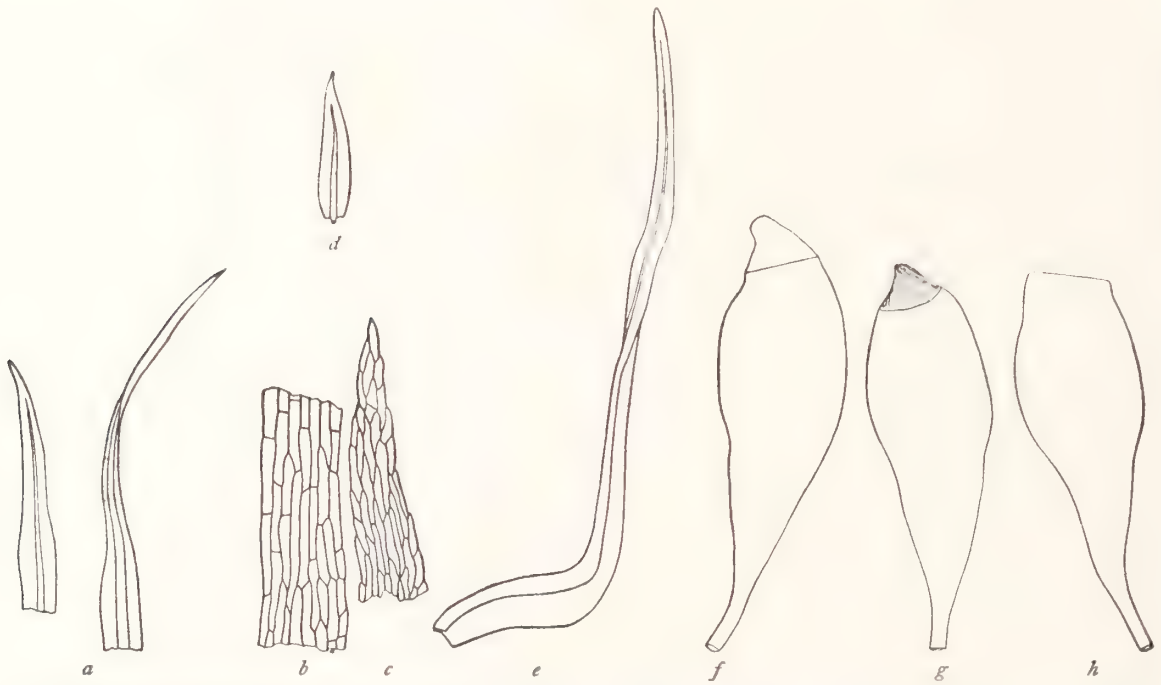
Dioicum; vel aliis muscis intermixtum vel dense cæspitosum, cæspitibus expansis, inferne fuscis, superne lutescente viridibus, nitidis.

Planta feminea. *Caulis* simplex, gracillimus, strictus, usque ad 1.5 cm. altus; folia inferiora et mediana remota, parva, vix 2 mm. longa, lineari-lanceolata vel linearia, superiora raptim longiora, elongate attenuata, usque ad 5 mm. longa et basi 0.35 mm. lata, haud decurrentia, siccitate plerumque erecta, humiditate e basi erecta arcuato-recurvata, basi medioque canaliculata, apicem versus plana, marginibus planis, integerrimis vel superne ob cellulas prominentes remote subserrulatis, *nervo* rubro, valido, basi c. 0.09 mm. crasso, stricto, infra summum apicem evanido; *cellulæ* flavæ, pellucidæ, apicales elongate subrhombeæ, ceteræ elongatæ, omnino rectangulæ; *bracteæ perichætii* foliis caulinis similes, sed supremis paulum longiores; *seta* tenuis, elongata, usque ad 3 cm. alta, fusco-rubra, nitida, flexuosa; *theca* subpyriformis asymmetrica, erecta, castanea, nitida, macrostoma, ore obliquo; *peristomium* pallide flavum; *dentes exostomii* lanceolati, c. 0.36 mm. alti et basi 0.064 mm. lati, inferne coaliti, linea divisurali distincta, inferne medioque minutissime papillosi, superne papillis subremotioribus et subvalidioribus ornati; lamellis paucis 8–10 instructi; *dentes endostomii* dentibus exostomii æquilongi, hyalini,

lævissimi, fere ad apicem longitudinaliter perforati . . .; *operculum* conicum, apice brevissimo, crasso, truncato coronatum; *sporæ* rotundæ, c. 0.028 mm. magnæ, lævissimæ.

Planta muscula. *Caulis* simplex vel pauci-ramosus, gracillimus, e basi ad medium radiculosus, radiculis atropurpureis, longe deorsum foliatus, *foliis* iis medianis plantæ femineæ similibus; *flores* terminales, discoidei; *bracteæ perigonii* e basi erecta sat raptim attenuata, valde elongata, usque ad 6 mm. longa, arcuata recurvata vel patentissima, *nervo* valido,

Fig. 15.



Leptobryum pottiaceum Dusén. *a*, folia mediana plantæ fem., $\frac{18}{1}$; *b*, cellulæ basales, $\frac{87}{1}$; *c*, cellulæ apicales, $\frac{87}{1}$; *d*, folium plantæ masc., $\frac{18}{1}$; *e*, folium perigoniale a latere visum, $\frac{18}{1}$; *f*, capsula operculata humiditate, $\frac{18}{1}$; *g*, capsula deoperculata humiditate, $\frac{18}{1}$; *h*, capsula deoperculata siccitate, $\frac{18}{1}$.

sat longe infra apicem evanido; paraphyses numerosi aurei, superne paulum crassiores, plerumque acutiusculi: antheridia fere cylindrica.

Hab. Patagonia australis in territorio fontinali fluminis Rio Chico in truncis putridis et in terra.

Fuegia australis ad Lapataia in terra.

Well distinguished from *Leptobryum pyriforme* (Hedw.) Schpr. as well as from *Leptobryum sericeum* from Tasmania, being marked by its long seta and erect, comparatively long, unsymmetrical, dark brown and shining capsule.

Gen. BRYUM Dill.

Bryum bimum Schreb.

Hab. Patagonia australis in territorio fontinali fluminis Rio Chico in terra paludosa.

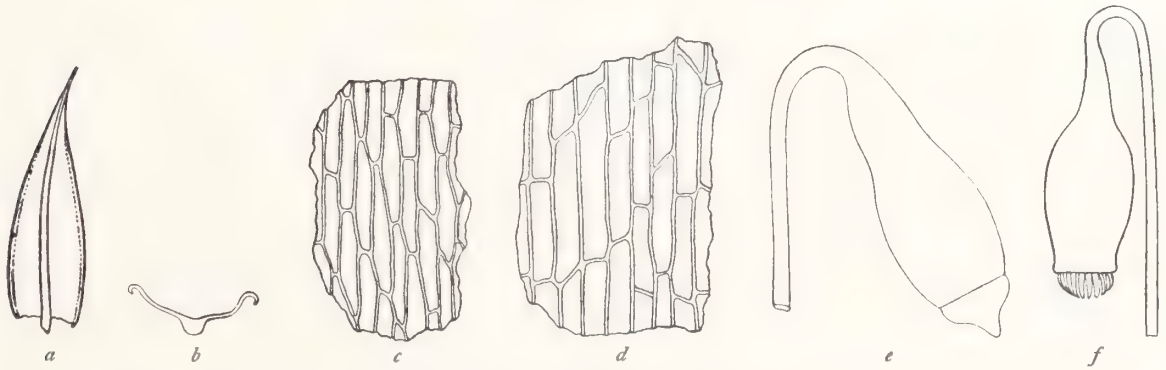
Patagonia australis ad Lapataia in terra paludosa.

Bryum lamprochæte Dusén n. sp.

Pl. IX, Figs. 13–15.

Synoicum; dense intricate cæspitosum, cæspitibus inferne fuscis, superne læte viridibus, sat expansis, humilibus, haud nitidis; *caulis* strictus, erectus, c. 1.5 cm. altus, fere tota longitudine radiculosus, radiculis atropurpureis, fasciculatis, inferne defoliatus, superne, præcipue apice innovando ramulosus, innovationibus c. 3 mm. longis; *folia* inferiora parva, sursum raptim accrescentia, suprema dense conferta, siccitate gemmate conniventia,

Fig. 16.



Bryum lamprochæte Dusén. *a*, folium, $\frac{18}{1}$; *b*, sectio folii, $\frac{32}{1}$; *c*, cellulæ apicales, $\frac{200}{1}$; *d*, cellulæ basales, $\frac{200}{1}$; *e*, capsula humiditate, $\frac{18}{1}$; *f*, capsula siccitate, $\frac{18}{1}$.

humida subrecta, usque ad 1.8 mm. longa et 0.5–0.7 mm. lata, stricta, canaliculata, haud decurrentia, late oblongo-lanceolata vel ovato-lanceolata, ob cellulas marginales elongatas, angustissimas, subtriseriatas sublimbata, marginibus reflexis, integerrimis vel apice denticulis paucis, remotis ornatis, carinate nervosa, *nervo* viridi, valido, basi 0.08 mm. crasso, excedente, in foliis supremis cuspidate excurrente; *cellulæ* laxæ, pellucidæ, interdum parce chlorophyllosæ, apicales subelongatæ, interdum subrhombeæ, basales paulum majores, rectangulæ, marginales angustissime elongatae; *bracteæ perichætii* foliis caulinis supremis similes; *seta* tenuis, stricta,

1.5–2.5 cm. alta, rubescenti-nitida; *theca* pendula, brunnea, clavata, collo siccitate rugoso, sporangio breviore; *dentes exostomii* lanceolate subulati, 0.43 mm. alti et 0.1 mm. lati, flavi, apice hyalini, papilloso-scaberuli, ceterum minutissime obscure granulosi, lamellis c. 9 robustis, margines dentium haud attingentibus; *dentes endostomii* hyalini, papillosi, usque ad apicem perforati, dentibus exterioribus paulum breviores; operculum convexe conicum, breviter crasseque apiculatum; cetera ignota.

Hab. Patagonia australis.

Resembling *Bryum validinervium* C. Müll. from Kerguelen Island, but distinct, differing from that species in its shorter stem, longer excurrent nerve, wider and weaker cells of the leaves and more remotely and more robustly lamellated external peristomial teeth.

Resembling also *Bryum macrantherum* C. Müll. from Kerguelen Island, but easily distinguished by the longer excurrent nerve of its leaves and its remotely lamellated external peristomial teeth; the teeth of the species just named have at least 25 lamellæ.

Bryum vernicosum Dusén n. sp.

Pl. X, Figs. 1, 2.

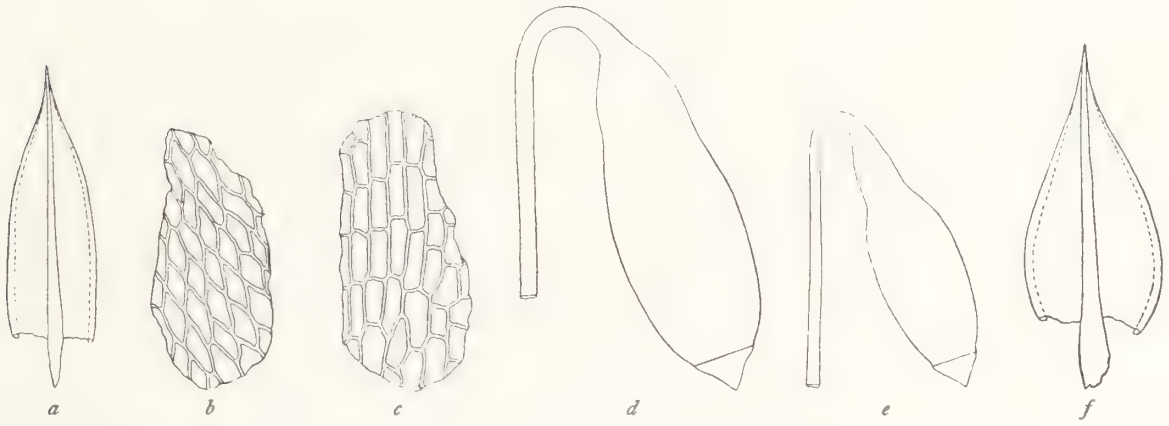
Dioicum; dense intertexte cæspitosum, cæspitibus expansis, humilibus, inferne fuscis, summitate lutescente viridibus, haud nitidis; *caulis* usque ad 1 cm. altus, e basi ad medium vel ultra radiculosus, radiculis atropurpureis, e medio foliosus, simplex vel interdum pauci-ramosus; *folia* infima parva, sursum sensim majora, sicca appressa, humida suberecta, stricta, haud decurrentia, usque ad 1.45 mm. longa et 0.5 mm. lata, concava, marginibus integerrimis, ubique reflexis, carinato-nervosa, *nervo* rubro, valido, basi 0.063 mm. crasso, percurrente, cum apice evanido vel breviter excedente; *cellulæ* laxæ, hyaline, sat firmæ, apicales medianæque plus minusque distincte rhombeæ, basales rectangulæ, marginales longiores, sed cellulis ceteris paulum diversæ; *bracteæ perichætii* foliis caulinis superioribus similes sed paulum majora, nervo longius excedente, sed vix cuspidato, *seta* stricta, tenuis, rubella, nitida, 2–2.5 cm. alta; *theca* pendula, fuscobrunnea, ore atropurpureo-vernicoso, collo sporangio siccitate lato-ovato vel oblongo-ovato breviore, *annulus* secedens, latus, tribus seriebus cellularum compositus; *dentes exostomii* subulati, aurei, 0.35 mm. alti et 0.045–0.050 mm. lati, superne hyalini, lævissimi, inferne minutissime granulosi, lamellis c. 15 prædíti; operculum stricte conicum, atro-

purpureum, vernicosum; *sporæ* 0.021–0.027 mm. magnæ, lævissimæ; cetera ignota.

Hab. Patagonia australis.

Nearly of the same appearance as *Bryum lamprochæte* Dusén, but well distinguished from that species by its stem being simple above, its narrower, more densely and more elegantly lamellated external peristomial teeth which are glabrous above, and by its exactly conical and shining

Fig. 17.



Bryum vernicosum Dusén. *a*, folium, $\frac{18}{1}$; *b*, cellulæ apicales, $\frac{200}{1}$; *c*, cellulæ basales, $\frac{200}{1}$; *d*, theca humiditate, $\frac{18}{1}$; *e*, theca siccitate, $\frac{18}{1}$; *f*, folium perigoniale, $\frac{18}{1}$.

operculum. Besides, the *Bryum vernicosum* is diœcious, the *Bryum lamprochæte* synœcious.

Our species seems to be related also to *Bryum minusculum* C. Müll., concluding from the diagnosis, but differs from that species by the absence of innovations, by its always pendulous capsule, the wider cells of its leaves, its much shorter cuspidate leaves, and by its perichætial leaves.

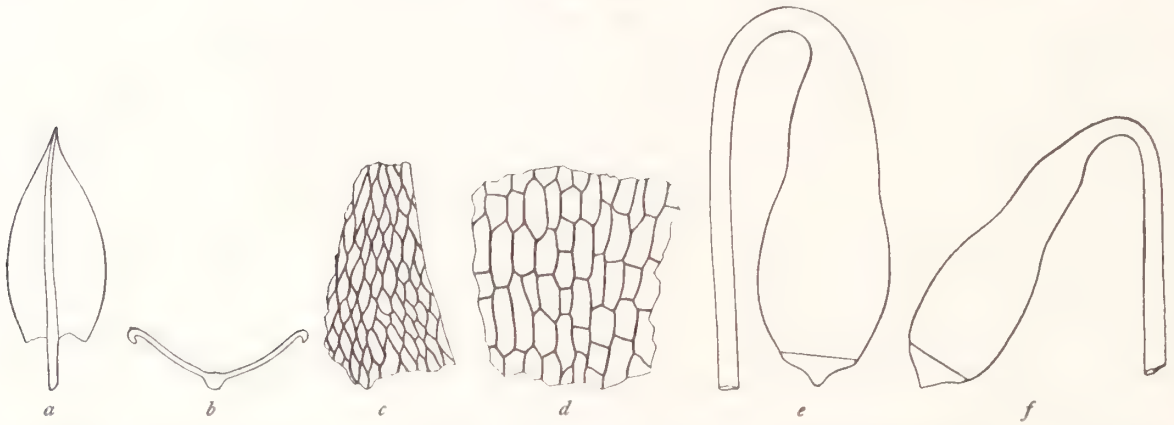
Bryum rigochæte Dusén n. sp.

Pl. X, Figs. 3, 4.

Synoicum; dense cæspitosum, cæspitibus inferne fuscis, superne viridibus, haud nitidis; caulis c. 2 cm. altus, strictus, ad medium atropurpureo-radiculosus, inferne defoliatus, simplex vel fertilitate superne innovando pauci-ramosus; *folia* sicca appressa, humida suberecta, c. 2.7 mm. longa et 1.2 mm. lata, haud decurrentia, ovato-oblonga, leviter incurvata, acuta, apicibus strictis vel paulum reflexis, subcochleariforme concava, marginibus integerrimis reflexisque, carinato-nervosa, *nervo* rubescente, valido,

basi 0.06 mm. crasso, percurrente, cum apice evanescente vel paulum excedente; *cellulæ* pellucidæ, densiusculæ, apicales medianæque rhombeæ vel subhexagonæ, marginales anguste elongatæ, basales ampliores, omnino rectangulæ; *bracteæ perichætii* foliis caulinis similes, sed paulum majores; *seta* erecta, stricta, rigida, fusco-brunnea, subnitida, c. 2 cm. alta; *theca* pendula, brunnea, elongate pyriformis, collo sporangium fere

FIG. 18.



Bryum rigochæte Dusén. *a*, folium, $\frac{18}{1}$; *b*, sectio folii, $\frac{32}{1}$; *c*, cellulæ apicales, $\frac{87}{1}$; *d*, cellulæ basales, $\frac{87}{1}$, *e*, capsula humiditate, $\frac{18}{1}$; *f*, capsula siccitate, $\frac{18}{1}$.

æquante; *dentes exostomii* lanceolate subulati, aurei, superne scabri, ceterum minutissime granulosi, 0.35 mm. alti et basi 0.08 mm. lati, linea divisurali distincta, lamellis c. 16 prædíti; *operculum* convexe conicum, breviter apiculato; *sporæ* lævissimæ, 0.027–0.030 mm. magnæ; cetera ignota.

Hab. speciei, Patagonia australis, ubi verisimiliter in territorio fontinali fluminis Rio Chico in terra paludosa lecta est.

Near to *Bryum lamprochæte* Dusén, but distinct and easily distinguished by its more robust stem, less acute and non-cuspidate leaves and much denser lamellated peristomial teeth. Resembling also *Bryum vernicosum* Dusén, but differing from that species by being more robust, simple or with only flagelliform innovations, ramulose stem, larger and less acute leaves with weaker nerve and much broader peristomial teeth.

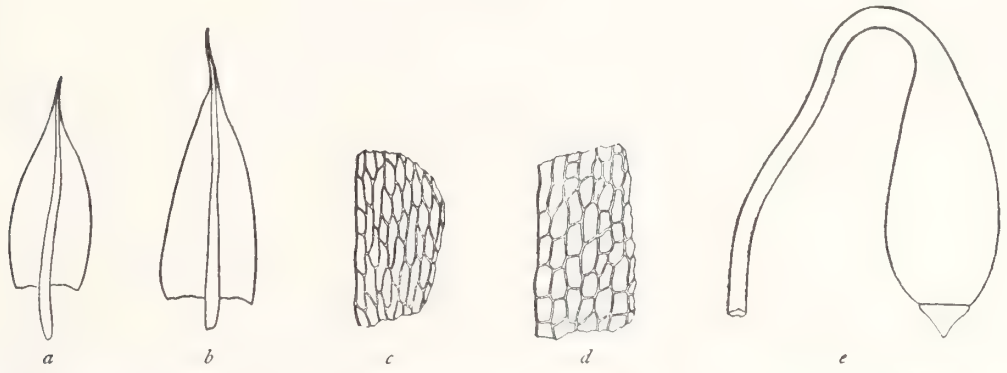
BRYUM HATCHERI Dusén n. sp.

Pl. X, Figs. 5, 6.

Dioicum; dense cæspitosum, cæspitibus humilibus, fuscoviridibus, haud nitidis, caulibus inferne leviter intertextis, *caulis* c. 1 cm. altus, erectus vel

subascendens, e basi ad medium parce radiculosus, simplex vel basi pauci-ramosus, fertilitate sæpe innovando superne ramulosus, sat tenuis; folia sicca appressa, humida erecta, suprema gemmaceo-conferta, usque ad 2 mm. longa et 0.6 mm. lata, haud decurrentia, ovata-oblonga, cuspidata, concava, elimbata, marginibus integerrimis, haud vel vix reflexis, carinato-nervosa, *nervo* crasso, basi c. 0.08 mm. lato, inferne rubescente, superne viridi, præcipue in foliis supremis longe excedente, summo apice

FIG. 19.



Bryum hatcheri Dusén. *a*, *b*, folia, $\frac{18}{1}$; *c*, cellulæ apicles, $\frac{200}{1}$; *d*, cellulæ basales, $\frac{200}{1}$; *e*, capsula humiditate, $\frac{18}{1}$.

rarissime pauci-denticulato; *cellulæ* laxæ, pellucidæ apicales medianæque subelongatæ, plus minusque distincte hexagonæ basales laxiores, rectangulæ; *bracteæ perichætii* foliis caulinis similes, sed paulum majores et longius cuspidatæ; *seta* erecta, subflexuosa, brunnea nitidiuscula, tenuis, usque ad 1 cm. alta; *theca* pendula, sat parva, oblonge obovata, brunnea, collo turgido, sensim in sporangium transeunte; *annulus* duplex; dentes exostomii humiles, subulati, 0.3 mm. alti et 0.04–0.05 mm. lati, superne hyalini et lævissimi, ceterum flaviduli et minutissime granulosi, fere glabri, remote lamellati, lamellis altis, c. 7; *operculum* stricte conicum; cetera ignota.

Hab. specici, Patagonia australis, ubi verisimiliter in territorio fontinali fluminis Rio Chico in terra lecta est.

Nearly allied to *Bryum minusculum* C. Müll., to judge from the diagnosis differing in the stronger nerve of its leaves, and their larger size, and by its perichætial leaves, pendulous capsule and conical operculum.

Gen. WEBERA Hedw.

Webera cruda (L.) Schwaegr.

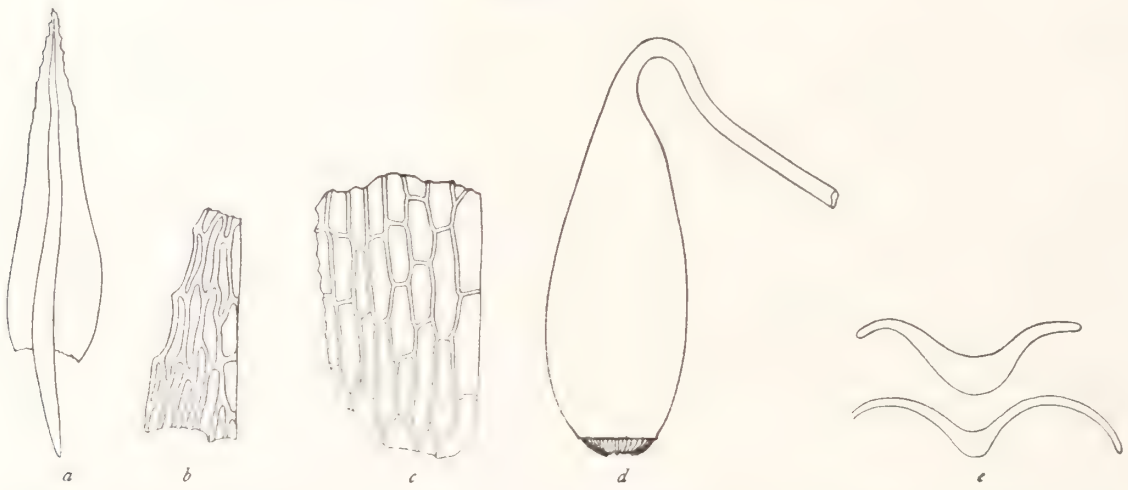
Hab. Patagonia australis in territorio fontinali fluminis Rio Chico ad basin arborum.

Webera lonchochæte Dusén n. sp.

Pl. X, Figs. 7–9.

Caulis gracillimus, erectus, strictus, simplex vel pauciramosus, inferne defoliatus, e basi fere ad apicem atropurpureo-radiculosus, usque ad 3.5 cm. altus; *folia* sicca subappressa, humida suberecta, stricta, inferiora parva, sursum sensim accrescentia, lutescente viridia, nitida, c. 2 mm.

Fig. 20.



Webera lonchochæte Dusén. *a*, folium, $\frac{32}{1}$; *b*, cellulæ apicales, $\frac{200}{1}$; *c*, cellulæ basales, $\frac{200}{1}$; *d*, capsula humiditate, $\frac{18}{1}$; *e*, sectiones folii, $\frac{87}{1}$.

longa et 0.4 mm. lata, paulum decurrentia, e basi subovata lanceolata, acuta, elimbata utroque latere arcuate replicato, marginibus planis, apicem versus serrulatis, ceterum integerrimis, carinato-nervosa, *nervo* validó, basi 0.09 mm. crasso, viridi, subflexuoso, percurrente, sed apicem vix attingente; *cellulæ* firmæ, pellucidæ, lutescente virides, apicales et medianæ elongatæ, basales laxiores, subrectangulæ, ad marginem distincte rectangulæ; *bracteæ perichætii* foliis caulinis similes, sed longius attenuatæ; *seta* tenuis, stricta, erecta, rubescens, nitidula, usque ad 4.5 cm. alta; *theca* pendula, pallide purpurea, ovato-oblonga, collo turgido, in sporangium indistincte transeunte; *dentes exostomii* lanceolati, flavi,

0.44 mm. alti et basi 0.08 mm. lati elimbati, superne hyalini et papilloso-scaberuli, ceterum minutissime granulosi, dense lamellati, lamellis 15–18, subdenticulati; *dentes endostomii* dentibus exostomii æquilongi, hyalini, late perforati, superne nodulosi et papilloso-scaberuli; *cilia* dentibus æquilonga, nodiuscula, scaberula, singula vel interdum bina; *membrana basilaris* 0.2 mm. alta.

Hab. speciei Patagonia australis, ubi in territorio fontinali fluminis Rio Chico in consortio *Aulacomnii palustris* (L.) Schwaegr. occurrit.

Nearly related to *Webera sphagnicola* Schpr., but differing from that species by its elimbate and comparatively remotely lamellated external peristomial teeth and by having fewer cilia; besides the *Webera loucho-chæte* is synœcious, the *Webera sphagnicola* diœcious.

Fam. Meeseaceæ.

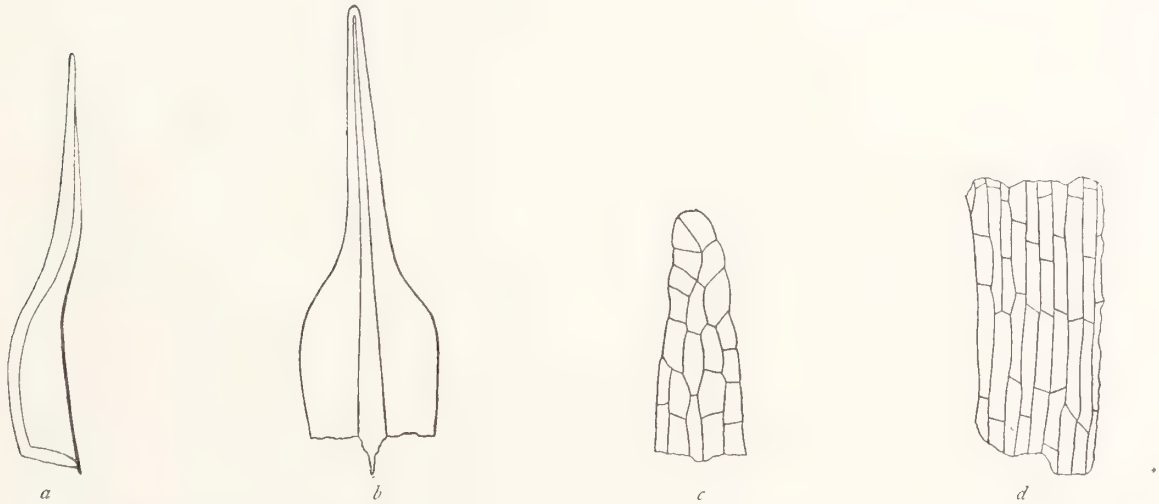
Gen. MEESEA Hedw.

Meesea patagonica Dusén n. sp.

Pl. XI, Fig. 1.

Dense cæspitosa; *caulis* gracillimus, usque ad 10 cm. longus, simplex, parce radiculosus vel fere eradiculosus, inferne flexuosus, nudus, fuscus, superne strictus, sordide viridis; *folia* 2.5–3.0 mm. longa et basi plane-facta 0.8 mm. lata, trifaria, sat distantia, siccitate plus minusque crispata,

Fig. 21.



a *b* *c* *d*

Meesea patagonica Dusén. *a*, folium a latere visum, $\frac{22}{1}$; *b*, folium deplanatum, $\frac{22}{1}$; *c*, apex folii, $\frac{200}{1}$; *d*, cellulæ basales folii, $\frac{200}{1}$.

humiditate stricta, patentia, c. basi amplexicauli, haud decurrente, lata et brevi raptim contracta, elongate cuspidata, canaliculata, apice rotundata, marginibus integerrimis, erectis, nervo valido, basi 0.18 mm. lato, indistincte limitato, infra summum apicem evanescente; *cellulæ* laxæ, pellucidæ, parietibus teneris, basales rectangulæ, apicales ceteris multo breviores; cetera desunt.

Hab. speciei Patagonia australis, ubi verisimiliter in territorio fontinali fluminis Rio Chico lecta est.

Nearest to *Meesea austro-georgica* C. Müll., differing from that species by its entire leaves, its rectangular leaf-cells and non-excurrent nerve.

The species is one of the most interesting of those brought home from South America by Mr. Hatcher. Hitherto there were only two species of the genus *Meesea* know from the southern part of the globe, viz., *M. austro-georgica* C. Müll. from south Georgia and *M. mulleri* C. Müll. et Hampe from Australia. The *M. patagonica* is then the third species of this genus known from the southern hemisphere.

Fam. Mniaceæ.

Gen. MNIUM Drill.

Mnium rostratum Schrad.

Hab. Patagonia australis in paludosis.

Fam. Rhizogoniaceæ.

Gen. RHIZOGONIUM Brid.

Rhizogonium mnioides (Hook.) Schpr.

Hab. Patagonia australis.

Rhizogonium subbasilare (Hook.) Schpr.

Hab. Patagonia australis.

Fam. Leptostomaceæ.

Gen. LEPTOSTOMUM R. Br.

Leptostomum menziesii (Hook.) R. Br.

Hab. Patagonia australis.

EXPLANATION OF PLATE VII.

PAGE

ANISOTHECIUM PERPUSILLUM Dusén, n. s. 66

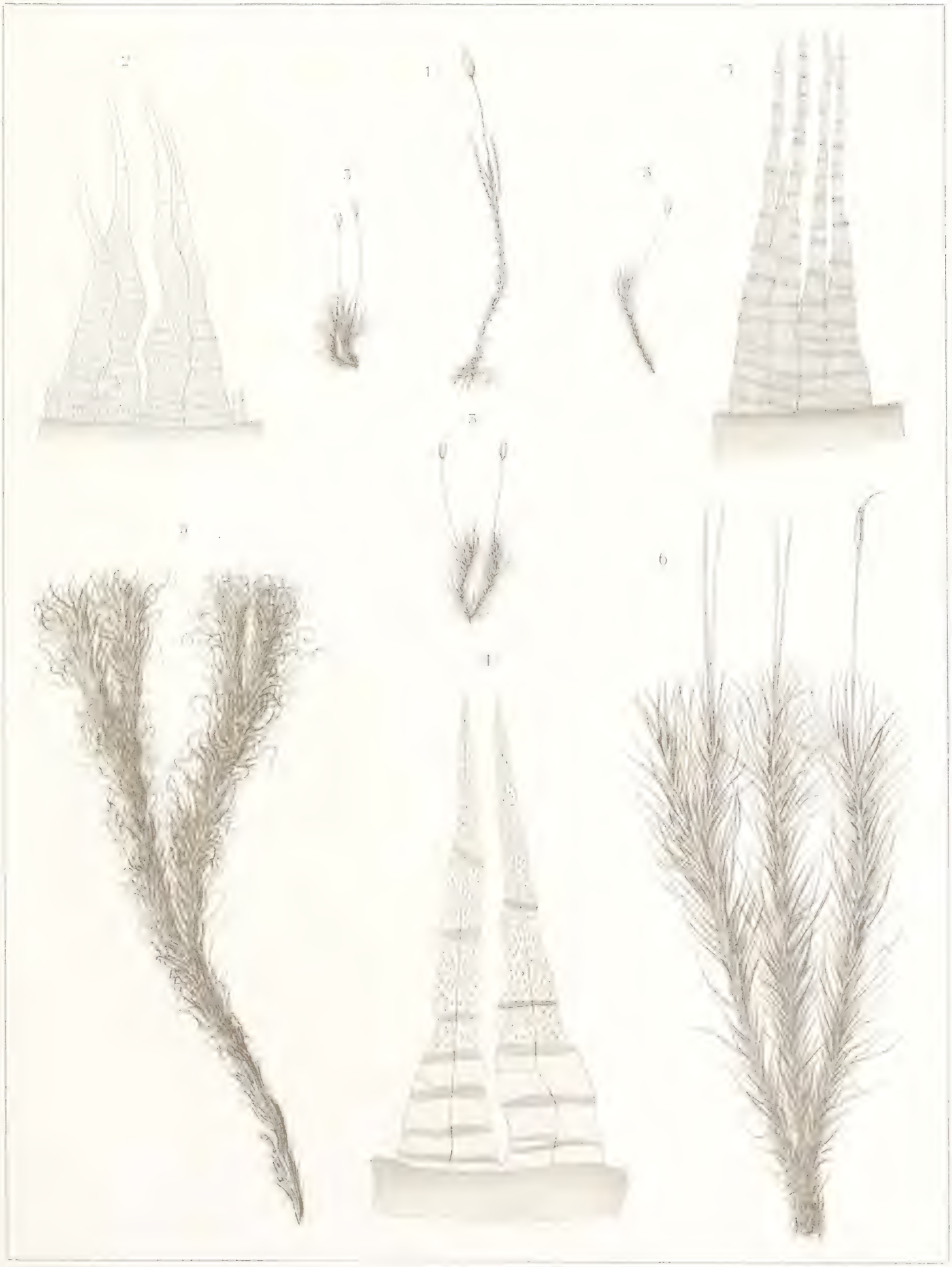
Fig. 1. Planta (× 2).
Fig. 2. Dentes peristomii (defectivi) (× 175).

DICRANOWEISIA PERPULVINATA Dusén, n. s. 67

Fig. 3. Planta (× 2).
Fig. 4. Pars peristomii (× 250).

DICRANUM CIRRHIFOLIUM Schpr. 69

Fig. 5. Planta siccitate, mag. nat.
Fig. 6. Planta humiditate, mag. nat.
Fig. 7. Pars peristomii (× 175).



EXPLANATION OF PLATE VIII.

PAGE

DICRANUM SCABERRIMUM Dusén. 70

Fig. 1. Planta, mag. nat.

DICRANUM DICRANELLATUM Dusén, n. s. 74

Fig. 2. Plantæ, mag. nat.

Fig. 3. Dentes peristomii (× 175).

BARBULA PERRUBIGINOSA Dusén, n. s. 75

Fig. 4. Planta, mag. nat.

GRIMMIA FALLAX Dusén. 77

Fig. 5. Plantæ (× 2).

Fig. 6. Pars peristomii (× 125).

GRIMMIA MACROPULVINATA Dusén, n. s. 78

Fig. 7. Plantæ (× 4).

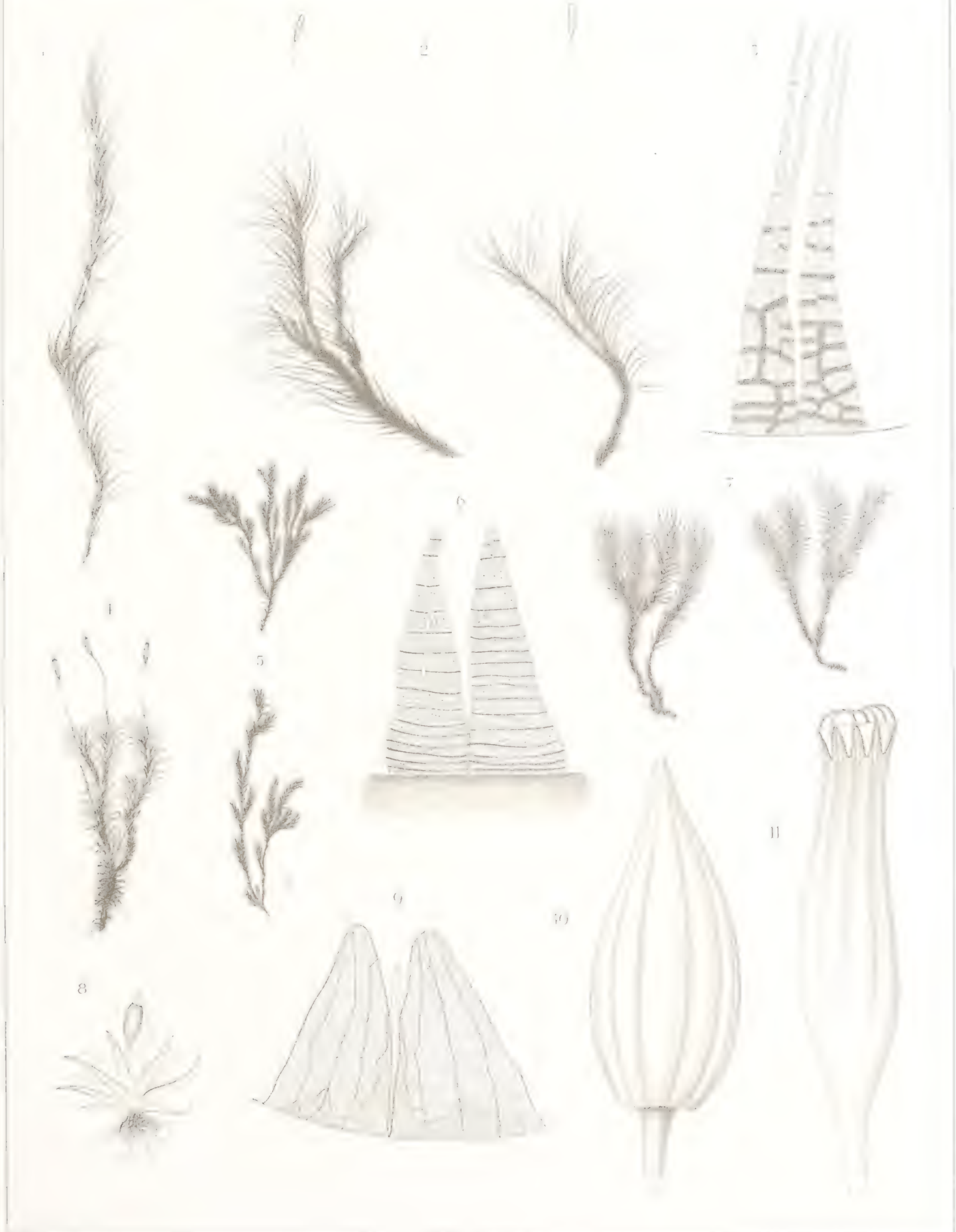
ORTHOTRICHUM MACLOSKII Dusén, n. s. 80

Fig. 8. Planta (× 8).

Fig. 9. Pars peristomii (× 200).

Fig. 10. Theca calyptrata juventute (× 18).

Fig. 11. Theca deoperculata siccitate (× 18).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EXPLANATION OF PLATE IX.

PAGE

ORTHOTRICHUM COMPACTUM Dusen, n. s. 81

Fig. 1. Planta (× 3).
Fig. 2. Capsula siccitate (× 35).
Fig. 3. Pars peristomii (× 285).

ULOTA HAMATA Dusén, n. s. 82

Fig. 4. Planta (× $\frac{4}{1}$).

MACROMITRIUM BIFASCICULARE C. Muell. 83

Fig. 5. Plantæ, mag. nat.

ZYGODON CURVICAULIS Dusén, n. s. 84

Fig. 6. Planta siccitate (× 10).
Fig. 7. Planta humiditate (× 2).

ZYGODON HATCHERI Dusén, n. s. 86

Fig. 8. Planta humiditate, mag. nat.
Fig. 9. Planta siccitate (× 2).

LEPTOBRYUM POTTIACEUM Dusén, n. s. 87

Fig. 10. Planta fem., mag. nat.
Fig. 11. Planta masc., mag. nat.
Fig. 12. Pars peristomii (× 87).

BRYUM LAMPROCHÆTE Dusén, n. s. 89

Fig. 13. Planta, mag. nat.
Fig. 14. Pars endostomii (× 175).
Fig. 15. Dens peristomii a latere visus (× 200).

EXPLANATION OF PLATE X.

PAGE

BRYUM VERNICOSUM Dusén, n. s. 90

Fig. 1. Planta, mag. nat.
Fig. 2. Pars endostomii (× 200).

BRYUM RIGOCHÆTE Dusén, n. s. 91

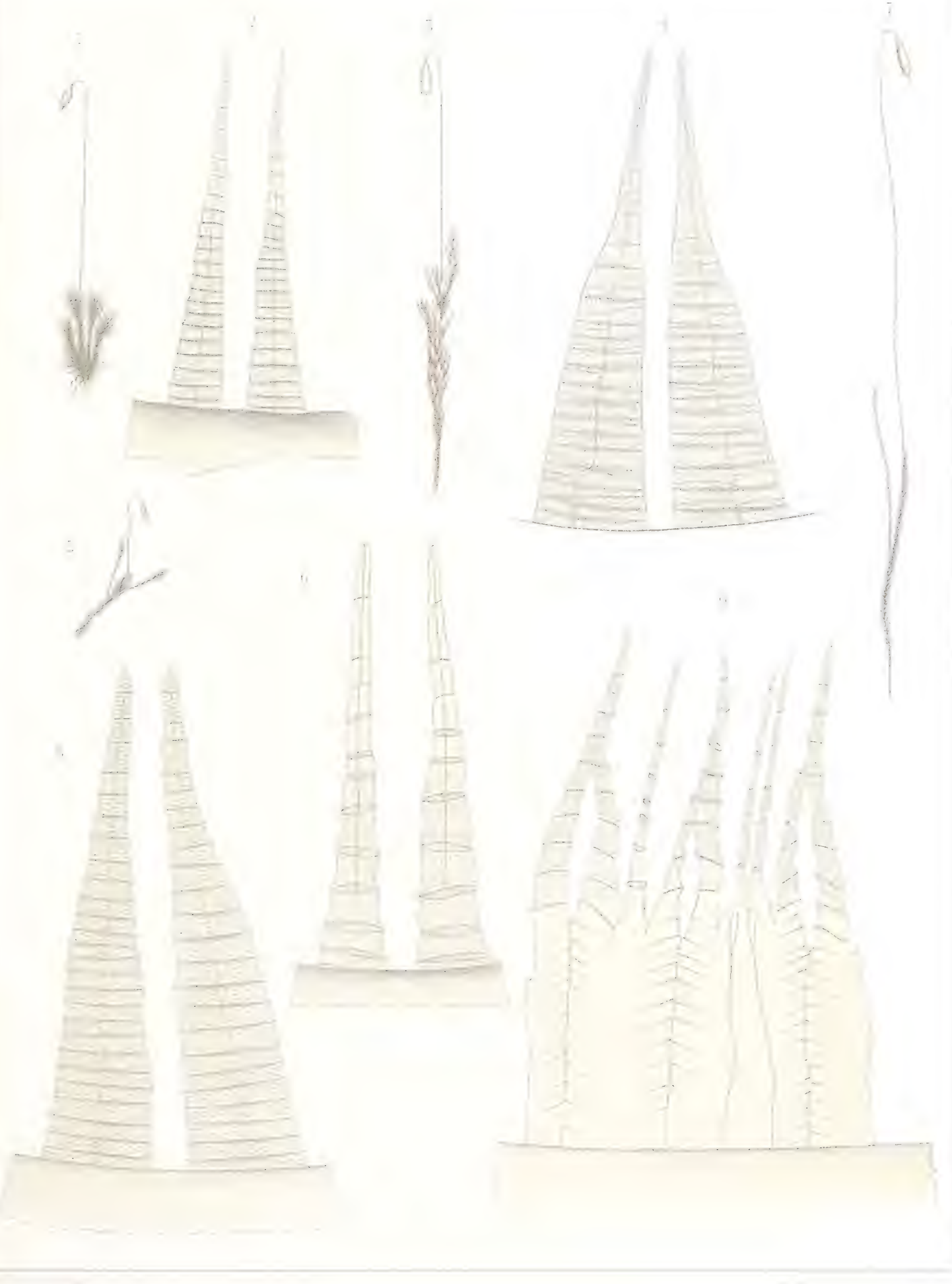
Fig. 3. Plata, mag. nat.
Fig. 4. Pars exostomii (× 285).

BRYUM HATCHERI Dusén, n. s. 92

Fig. 5. Planta, mag. nat.
Fig. 6. Pars exostomii (× 200).

WEBERA LONCHOCHÆTE Dusén, n. s. 94

Fig. 7. Planta, mag. nat.
Fig. 8. Pars exostomii (× 175).
Fig. 9. Pars endostomii (× 175).



Fam. Aulacomniaceæ.

Gen. AULACOMNIUM Schwaegr.

Aulacomnium palustre (L.) Schwaegr.

Hab. speciei Patagonia australis, ubi in territorio fontinali fluminis Rio Chico in consortio *Weberæ lonchochætis* Dusén in paludosis occurrit.

Fam. Bartramiaceæ.

Gen. BARTRAMIA Hedw.

Bartramia magellanica Aongstr.

Hab. Fuegia australis ad Lapataia.

Bartramia aristata Schpr.

Hab. Fuegia australis ad Villarino.

Bartramia ityphylla Brid. var. arenæ Besch.

Hab. varietatis Patagonia australis, ubi verisimiliter in territorio fontinali fluminis Rio Chico lecta est.

Bartramia patens Brid. var. minor Dusén.

Humilior densiusque cæspitosa, a typo partium omnium exiguitate differt.

Hab. Patagonia australis.

Gen. BARTRAMIDULA Br. Eur.

Bartramidula exigua (Sull.) Jaeg.

Hab. Patagonia australis.

Gen. PHILONOTIS Brid.

Philonotis vagans (Hook. fil. et Wils.) Mitt.

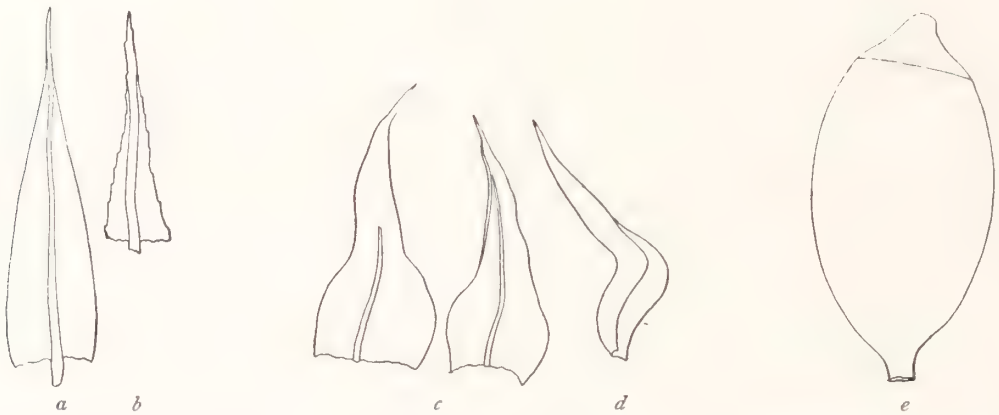
Hab. Patagonia australis in paludosis.

Philonotis parallela Dusén n. sp.

Dioica; dense cæspitosa, cæspitibus superne viridibus vel lutescente-viridibus, inferne fusco-tomentosis, expansis, *caulis* erectus, strictus,

omnino c. 3 cm. altus, interdum usque ad 1 dm. altus, ad basin florum innovationes paucas, omnino 1–3 producens, inferne radiculosus, radiculis lævissimis; *folia* inter se conformia, c. 1.4 mm. longa et 0.35–0.40 mm. lata, erecto-patula, heteromalla, lanceolata, subcuspidata, canaliculata, haud plicata, haud decurrentia, marginibus erectis, præcipue apicem versus serrulatis, *nervo* valido, basi 0.063 mm. crasso, subexcurrente, lævissimo; *cellulæ* rectangulæ, dorso leviter papillosæ; *bracteæ perichætii* erectæ, longe attenuatæ, cuspidatæ, cellulis apicalibus angustis, ceterum foliis caulinis similes; *seta* erecta, stricta, c. 2.5 cm. alta, gracilis, rubra, lævissima; capsula erecta, humiditate late ovalis, c. 2.4 mm. longa et 1.35 mm. crassa, siccitate fere cylindrica, subcurvata, 13–16-sulcata, pachydermatica, olivacea, ore rubro; *cellulæ exothecii* omnino rotundate rec-

FIG. 22.



Philonotis parallela Dusén. *a*, folium, $\frac{32}{1}$; *b*, apex folii, $\frac{87}{1}$; *c*, folia perigonialia, $\frac{18}{1}$; *d*, folium perigoniale a latere visum, $\frac{18}{1}$; *e*, capsula humiditate, $\frac{18}{1}$.

tangulares, marginales minores, 6–7-seriatæ, illæ striarum parietibus longitudinalibus incrassatis; *dentes exostomii* rubri, 0.4 mm. alti et 0.076 mm. lati, lanceolate subulati, vix dense lamellati, inferne minutissime papillosi, superne papillis crassioribus ornati; *dentes endostomii* dentibus exostomii paulum breviores, papillosi; *cilia* singula vel bina, dentibus endostomii fere æquilonga et paulum angustiora; *operculum* conicum, haud rostratum, apice oblique, truncato.

Flores masculi disciformes, bracteis e basi erecta genuflexe patentissimis, usque ad 2.3 mm. longis et 1.8 mm. latis, lanceolatis, serrulatis, acutissimis, nervo lato, indistincte limitato, infra apicem evanido, cellulis basalibus aureis, rectangulis, apicalibus, prosenchymaticis.

Hab. Patagonia australis in territorio fontinali fluminis Rio Chico in paludosis.

Resembling *Philonotis fontana* (L.) Brid. but well distinguished from that species by its uniform, lanceolate and not plicate leaves with erect margins, by the absence of incrassations interposed between the upper lamellæ of the external peristomial teeth, etc.

Fam. Polytrichaceæ.

Gen. POLYTRICHADELPHUS C. Müll.

Polytrichadelphus magellanicus (Linn. fil.) Mitt.

Hab. Patagonia australis.

Gen. POLYTRICHUM Dill.

Polytrichum juniperinum Hedw.

Hab. Patagonia australis.

Polytrichum strictum Menz.

Hab. Patagonia australis.

Polytrichum patagonicum C. Müll.

Hab. Patagonia australis.

PLEUROCARPINEÆ.

Fam. Leucodontaceæ.

Gen. LEPYRODON Hampe.

Lepyrodon lagurus (Hook.) Mitt.

Hab. Patagonia australis in territorio fontinali fluminis. Rio Chico in truncis arbustorum arborumque.

Lepyrodon implexus (Kze.) Par.

Hab. Fuegia australis ad Lapataia in truncis *Berberidis ilicifoliæ*.

Fam. Leskeaceæ.

Gen. LESKEA Hedw.

Leskea fuegiana Besch.

Hab. Fuegia.

Fam. Stereodontaceæ.

Gen. CATAGONIUM C. Müll.

Catagonium politum (Hook. fil. et Wils.) C. Müll.

Hab. Patagonia australis.

Gen. ACROCLADIUM Mitt.

Acrocladium auriculatum (Mont.) Mitt.

Hab. Patagonia australis in territorio fontinali fluminis Rio Chico in terra.

Gen. PLAGIOTHECIUM Br. Eur.

Plagiothecium leptoplumosum Dusén n. sp.

Pl. XI, Figs. 3–5.

Autoicum; dense cæspitosum, cæspitibus humillimis, plus minusque expansis, viridibus vel lutescenti-viridibus, subnitidis, mollibus; *caulis* gracillimus, subascendeus, ad basin ferrugineo-tomentosus, ramos nonnullos, plerumque simplices emittens, usque ad 1.5 cm. longus; *folia* densa, c. 1.1 mm. longa et deplanata 0.4 mm. lata, plerumque subsecunda, e basi semiamplexicauli, haud decurrente ovata vel late lanceolata, canali-

Fig. 23.

a *b* *c*

Plagiothecium leptoplumosum Dusén. *a*, folia, $\frac{32}{1}$; *b*, theca humiditate, $\frac{18}{1}$; *c*, pars superior thecæ operculatæ humiditate, $\frac{18}{1}$.

culate concava, omnino sat longe cuspidata, marginibus erectis, integerrimis, enervata; *cellulæ* anguste elongatæ, basales ceteris subbreviores, alares vix diversæ; *bracteæ perichætii* erectæ, semiconvolutæ, enervatæ, apice sat raptim contractæ, breviter acutatæ, integerrimæ; *seta* 1.5–2 cm.

alta, gracilis, rubra, strictiuscula, superne sinistrorsum, inferne dextrorsum torta, lævissima; theca fere erecta, cylindrica, paulum curvata, pallide brunnea, siccitate sub ore constricta, lævissima, collo distincto; *annulus* simplex; *dentes exostomii* pallide flavi, 0.44 mm. alti et basi 0.06 mm. lati, anguste lanceolati, dense lamellati, inferne medioque transversaliter striati, superne articulati et papillosi; *dentes endostomii* hyalini, dentibus exostomii paulum breviores, subulati, minutissime granulosi, angustissime longitudinaliter perforati; *cilia* 1–3, setacea, nodulosa, minutissime granulosa, dentibus endostomii paulum breviora; *membrana basilaris* c. 0.18 mm. alta; *operculum* conicum, obtusum, haud rostratum.

Flores masc. gemmiformes, ad basin floris fem. dispositi, in tomento occulti.

Hab. speciei Patagonia australis, ubi verisimiliter in territorio fontinali fluminis Rio Chico lecta est.

Completely resembling and closely allied to *Plagiothecium pulchellum* (Dicks.) Br. Eur., but differing from that species by its usually broader and longer cuspidate leaves, more uniform leaf-cells, inner peristomial teeth shorter than the outer, and its simple annulus.

The species also resembles, to judge from the diagnosis, *Plagiothecium fuegianum* (Besch.) differing by its subfalcate and more or less distinctly secund leaves with straight apex, non-papillous perichætial leaves and cylindrical capsule.

Fam. Hypnaceæ.

Gen. BRACHYTHECIUM Br. Eur.

Brachythecium paradoxum (Hook. fil. et Wils.) Besch.

Hab. Patagonia australis in territorio fontinali fluminis Rio Chico, ubi in truncis putrescentibus et in terra occurrit.

Gen. SCIAROMIUM Mitt.

Sciaromium confluens C. Müll.

Hab. speciei Patagonia australis, ubi verisimiliter in territorio fontinali fluminis Rio Chico lecta est.

Sciaromium depastum Dusén n. sp.

Pl. XI, Fig. 2.

Dioicum; densiuscule cæspitosum, cæspitibus expansis, rigidis, superne læte viridibus inferne pallide brunneis; *caulis* strictus, erectus, usque ad

7 cm. altus, inferne costis limbisque persistentibus foliorum vetustorum obtectus, remote ramosus, non rare 2–3 furcatus vel interdum remote fasciculatim ramosus, ramis erectis, simplicibus; *folia* oblonge ovata, subacuta, heteromalla, leviter concava, fere plana, humiditate e basi patentissima leviter incurvata, siccitate magis inflexa, c. 1.25 mm. longa et 0.62 mm. lata, integerrima, carinato-nervosa, nervo valido, basi c. 0.1 mm. crasso, lævissimo, percurrente, crasse limbata, limbo circumducto, ad medium folii c. 0.07 mm. lato; cellulæ parvæ, obscuræ, omnino subrectangulæ.

Fig. 24.

Sciaromium depastum Dusén. *a*, folia, $\frac{18}{1}$; *b*, cellulæ apicales, $\frac{200}{1}$; *c*, cellulæ basales, $\frac{200}{1}$.

Flores fem. in parte superiore caulis dispositi, parvi, gemmiformes, archegoniis sat paucis, paraphysibus paucis, setaceis, flavis, cetera ignota.

Hab. Fuegia australis ad Villarino.

An excellent species, well distinguished from all the other South American species of the same genus by its straight stem, heteromallous and patent, not falcate, and neither subulate nor aristate leaves.

Sciaromium gracile Dusén n. sp.

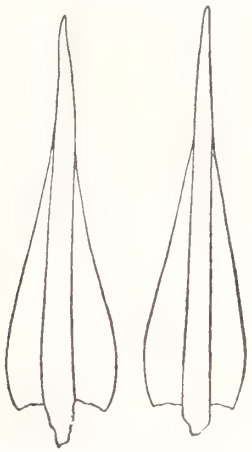
Pl. XI, Fig. 6.

Caulis gracilis, strictus vel strictiusculus, usque ad 5 cm. longus, inferne pallide brunneus, nervis foliorum vetustiorum resistentibus vestitus, superne foliatus viridis, subsimplex vel vage et remote distichaseo-ramosus, ramis simplicibus, tum brevibus, tum sat longis; *folia* patentia, homomalla, c. 1.5 mm. longa et 0.40–0.45 mm. lata, densiuscula, haud decurrentia, e basi ovata sensim attenuata, elongate cuspidata, paulum concava, elimbata, marginibus integerrimis, erectis; *nervo* robusto, viridi, basi 0.12–0.15 mm. lato, paulum supra medium folii excurrente, cuspidem crassiusculam formante; *cellulæ* parvæ, angustæ, subelongatæ, obscuræ, basales ceteris paulum breviores et laxiores; cetera ignota.

Hab. speciei Fuegia australis, ubi ad Lapataia in consortio *Sciaromii depasti* lecta est.

A small and delicate species, very distinct, differing from all the other South American species in its minuteness and in its perfectly elimbated leaves.

FIG. 25.



Sciaromium gracile Dusén. Folia, $\frac{32}{1}$.

Gen. HYPNUM Dill.

HYPNUM UNCINATUM Hedw. subspecies SYMMETRICUM Ren. et Card.

Hab. Patagonia australis.

HYPNUM PERPLICATUM Dusén n. sp.

Pl. XI, Fig. 7.

Densiuscule cæspitosum, cæspitibus expansis, superne sordido-viridibus vel flavo-brunneis, inferne sordido-brunneis, rigidiusculis; *caulis* subascendens, plerumque c. 8 cm. interdum usque ad 15 cm. altus, apice falcatus, haud radiculosus, inferne defoliatus, sed nervis persistentibus foliorum vetustorum plus minusque dense obtectus, simplex vel plerumque superne saltem remotiuscule ramosus, ramis distichis et vix ramulosis; *folia* dense conferta usque ad 5.5 mm. longa et basi 0.9 mm. lata, uncinate falcata, e basi sublineari vix decurrente elongate lanceolata, cuspidata, canaliculata, longitudinaliter plicata, marginibus erectis, integerrimis, *nervo* valido, basi 0.25 mm. lata, sat longe excurrente, lævissimo; *cellulæ* anguste elongatæ, lævissimæ, parietibus paulum incrassatis, alares sat paucæ, omnino brevi-

ter rectangulæ, nervum haud attingentes, parietibus paulum sed parum interrupte incrassatis; cetera ignota.

Hab. Patagonia orientalis ad Cape Fairweather in paludosis.

FIG. 26.

Hypnum perplicatum Dusén. Folia, $\frac{18}{1}$.

Near to *Hypnum falcatum* Brid., but very distinct, differing from that species by its longer, quite glabrous and scarcely decurrent leaves with doubly broader and excurrent nerve, and by the absence of paraphylla.

STOCKHOLM, January 1, 1901.

(We desire to explain that for the method here followed, as elsewhere in these Reports, of printing all specific names with small initial letter, the respected author of this part is not responsible.—EDITOR.)

ERRATA AND EMENDATIONS IN PART III.

Page 67, line 11, for Lindl. read Lindb.
Page 67, line 17, for radiculosis read radiculosus.
Page 67, line 2 from foot, for vel papillosæ read lævissimæ.
Page 70, line 7 from foot, for shorter read longer and more robust; line 5 from foot add n. sp.
Page 71, line 2 from foot, for secto folio read sectio folii.
Page 72, lines 15, 14 from foot, delete all after the word "ones."
Page 73, fig. 5, cut *d* should be erect.
Page 74, line 10, for vel nitidis read nitidiusculis.
Page 74, line 11, for 2–3 read 2–4.
Page 74, line 13 from foot, after flavidula insert annulus triplex.
Page 74, lines 10, 9 from foot for subnodulari read subnodulosi.
Page 74, line 9 from foot, delete plicato-.
Page 75, line 5 from foot, for densiuscula read densiuscule.
Page 76, line 9, for incrassatis read subincrassatis.
Page 76, fig. 6, the cut *d* should be inverted.
Page 77, line 2, after dilatata add subclavata.
Page 77, line 6, for *conotricha* (Müll) read *anderssonii* Card.
Page 77, line 9, add *B. perrubiginosa* is evidently a weak species.
Page 78, line 2, after incrassatis add et in cellulis infraapicalibus; after subflexuosis add supernæ nonnullæ plus minusque elongatæ; and for saltem read rare.
Page 79, fig. 8, *g* refers to the upper figure; and in the explanation of *g*, for humiditate read siccitate.
Page 80, fig. 9, cut *a* should be turned 90°; similarly page 83, fig. 11, cut *g*.
Page 80, line 1, omit speciei; similarly passim.
Page 82, line 9 from foot, for subuncinati read subuncinata.
Page 82, line 3 from foot, for 0.135 read 0.013.
Page 84, line 10 from foot, for incrassa- read incrassation.
Page 86, line 4, for and read ad.
Page 88, line 4, for MUSCULA read MASCULA.
Page 90, line 7 from foot, for majora read majores.
Page 94, line 7, before *Caulis* prefix *Synoica*.
Page 96, line 1 for c. basi read e basi.
Page 102, line 6 from foot, for homomalla read heteromalla.
Page 104, line 1, for parum read vix.
Page 104, line 5, for glabrous read entire.

(N. B. It should be observed that it was impracticable for the author to revise the proofs.—Ed.)

EXPLANATION OF PLATE XI.

PAGE

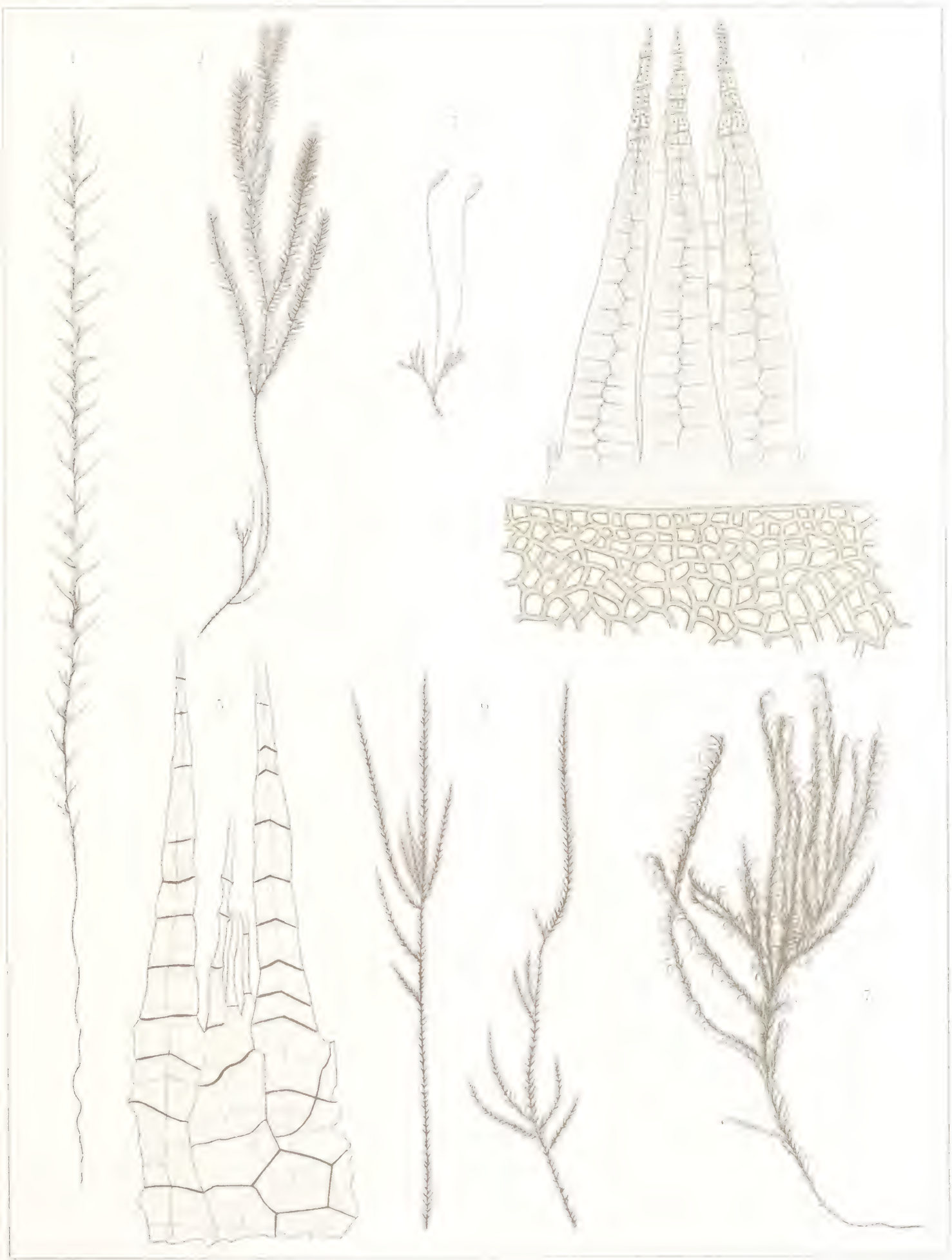
MEESIA PATAGONICA Dusén, n. s. 95
Fig. 1. Planta (× 3).

PLAGIOTHECIUM LEPTOPLUMOSUM Dusén, n. s. 100
Fig. 3. Planta, mag. nat.
Fig. 4. Pars peristomii (× 125).
Fig. 5. Pars endostomii (× 175).

SCIAROMIUM DEPASTUM Dusén, n. s. 101
Fig. 2. Planta, mag. nat.

SCIAROMIUM GRACILE Dusén, n. s. 102
Fig. 6. Planta, mag. nat.

HYPNUM PERPLICATUM Dusén, n. s. 103
Fig. 7. Planta, mag. nat.



CATALOGUE OF

MUSCI OF PATAGONIA AND FUEGIA.

(INCLUDING DESCRIBED SPECIES AND OTHERS NOT YET DESCRIBED.)

BY

PER DUSÉN.

MUSCI FROM THE FALKLAND ISLANDS, FUEGIA, AND PATAGONIA.

A. DESCRIBED SPECIES.

MUSCI.

SPHAGNALES.

Fam. SPHAGNACEÆ.

Gen. SPHAGNUM Dill.

Sphagnum cuspidatum Ehrh., var. *falcatulum* (Besch.) Par., Staaten I.; Cape Horn; Patagon. occ..

S. cuspidatum var. *microcarpum* (Warnst.) Par., Falkland Is.

S. cymbifolium Ehrh., var. *condensatum* Hook. f. & Wils., Fretum Magellanicum.

S. fimbriatum Wils., Falkland Is.; Hermite I.; Fretum Magellanicum.

S. fimbriatum var. *robustum* Braithw., Fuegia; Patagon. austr.

S. medium Limpr., var. *fusco-rubellum* Warnst., forma *brachydasyclada* Warnst.

S. medium var. *pallido-carneum* Warnst., form. *brachyorthoclada* Warnst.

ANDREÆALES.

Fam. ANDREÆACEÆ.

Gen. ACROSCHISMA Hook. f. & Wils.

Acroschisma wilsoni Hook. f., Hermite I.; Fuegia; Patagon. occ.

Gen. ANDREÆA Ehrh.

Andreæa acutifolia Hook. f. & Wils., Hermite I.; Cape Horn.
A. appendiculata Sch., Cape Horn; Fuegia.
A. laxifolia Hook. f. & Wils., Hermite I.; Cape Horn.
A. marginata Hook. f. & Wils., Hermite I.; Fuegia.
A. mutabilis Hook. f. & Wils., Falkland Is.
A. petrophila Ehrh., Fuegia.
A. pseudo-alpina C. Müll., Fuegia.
A. subulata Harv. var. *perichætialis* Harv., Falkland Is.; Hermite I.
A. subulata var. *rigida* Harv. & C. Müll., Hermite I.; Fuegia.

BRYALES.

ACROCARPINEÆ.

Fam. DICRANACEÆ.

Subfam. *DICRANELLEÆ.*

Gen. ANISOTHECIUM Mitt.

Anisothecium perpusillum Dusén.
A. patagonicum C. Müll., Patagon. austr.

Subfam. *DICRANEÆ.*

Gen. DICRANOWEISIA Lindb.

Dicranoweisia antarctica (C. Müll.) Par., Hermite I.; Fuegia.
D. austro-crispula (C. Müll.) Par., Staaten I.; Fuegia; Patagon. occ.
D. perpulvinata Dusén, W. Patagon.

Gen. ONCOPHORUS Brid.

Oncophorus fuegianus Card., Fuegia austr.

Gen. DICRANUM Hedw.

Dicranum aciphyllum Hook. f. & Wils., Falkland I.; Staaten I.; Fret. Mag. occ.; Patagon. occ.

D. australe Besch., Staaten I.; Fuegia; Fret. Mag.; Patagon. occ.

D. billardieri Schwaegr., Falkland Is.; Fuegia; Fret. Mag. occ.; Patagon. occ.

D. cirrhifolia Sch. in litt., Fuegia; Patag. austr. et occ.

D. dicranellatum Dusén, Fuegia; Patagon. occ.

D. harioti C. Müll., Fuegia; Hoste I.

D. imponens Mont., Staaten I.; Hermite I.; Cape Horn; Fuegia; Patagon. occ.

D. lati-costatum Card., Fuegia austr.; Fret. Mag.

D. leucopterum C. Müll., Staaten I.; Fuegia.

D. nigricaule Aongstr., Fuegia; Patagon. austr. et occ.

D. pumilum Mitt., Hermite I.; Fuegia.

D. racovitzæ Card., Fretum Magellan.

D. ramulosum Mitt., Hermite I.; Fuegia.

D. rigens Besch., Patagon. occ.

D. robustum Hook. f. & Wils., Hermite I.; Cape Horn; Fuegia; Fret. Mag.; Patagon. occ. — var. *pungens* Hook. f. & Wils. cum typo.

D. setosum Hook. f. & Wils, Fret. Mag.

D. tonini C. Müll., Patagon. austr.

Gen. CAMPYLOPUS Brid.

Campylopus acuminatus Mitt., Hermite I.; Fuegia.

C. crassissimus Besch., Patagon. occ.

C. flavissimus (C. Müll.) Par., Fuegia.

C. introflexus (Hedw.) Mitt., Patagon. occ.

C. laniger Besch., Hermite I., Fuegia; Patagon. occ.

C. morenoi C. Müll., Patagon. austral.

C. orthocomus Besch., Fuegia.

C. perincanus (C. Müll.) Par., Staaten I.

C. saddleanus Besch., Fuegia.

C. spegazzinii (C. Müll.) Par., Staaten I.

Subfam. *RHABDOWEISIEÆ.*

Gen. DICHODONTIUM Sch.

Dichodontium paludella Besch., Fuegia; Fret. Mag.
D. jamesoni (Taylor) Sch., Hermite I.

Subfam. *SELIGERIEÆ.*

Gen. BLINDIA Br. Eur.

Blindia arcuata Mitt., Hermite I.
B. auriculata C. Müll., Staaten I.; Fuegia.
B. churuccana Besch., Fret. Mag. occ.
B. contecta (Hook. f. & Wils.) C. Müll., Fret. Mag.; Patagon. occ.
B. curviseta Mitt., Falkland I.; Staaten I.; Hermite I.; Fuegia.
B. humilis C. Müll., Staaten I.
B. leptotrichocarpa C. Müll., Staaten I.
B. leptotrichocarpa var. *strictiuscula* C. Müll., Staaten I.
B. lygodipoda C. Müll., Staaten I.; Fuegia.
B. magellanica Sch., Hermite I.
B. savatieriana C. Müll., Fret. Mag. occ.
B. tenuifolia (Hook. f. & Wils.) Mitt., Hermite I.; Fuegia.

Subfam. *DITRICHEÆ.*

Gen. DITRICHUM Timm.

Ditrichum affine (C. Müll.) Hpe., Patagon. occ.
D. conicum (Mont.) Par., Patagon. occ.
D. hookeri (C. Müll.) Hpe., Hermite I.; Fuegia; Fret. Mag. occ.
D. hyalinum (Mitt.) Par., Falkland Is.; Hermite I.; Cape Horn; Fuegia.
D. longisetum Lor., Fret. Mag. occ.; Patagon. austr.
D. prœaltum (Mitt.) Par., Patagon. austr. et occ.
D. strictum (Hook. f. & Wils.), Falkland Is.; Hermite I.; Cape Horn; Fuegia.

Gen. DISTICHIUM Br. Eur.

Distichium capillaceum (L.) Br. Eur., Hermite I.; Cape Horn; Fuegia; Patagon. austr. et occ.

Gen. CERATODON Brid.

Ceratodon purpureus (L.) Brid., var. *amblyocalyx* C. Müll., Fuegia; Patagon.

Fam. Pottiaceæ.

Subfam. *POTTIEÆ.*

Gen. POTTIA Ehrh.

Pottia antarctica Aongstr., Fuegia; Patagon. austr.
P. megapoda C. Müll., Patagon. austr.
P. spegazzinii C. Müll., Staaten I.; Patagon. austr.

Gen. BARBULA Hedw.

Barbula antarctica Hpe., Falkland Is.
B. arenæ Besch., Fret. Mag.
B. andersonii (Aongstr.), Fuegia; Patagon. austr. et occ.
B. chrysopila C. Müll., Fuegia; Fret. Mag.
B. conotricha C. Müll., Fuegia; Patagon. austr.
B. conotricha C. Müll. var. *fagicola* C. Müll., Patagon.
B. crispatula (C. Müll.), Patagon. occ.
B. densifolia Hook. f. & Wils., Falkland Is.
B. flagellaris Sch., Fret. Mag.; Patagon. occ.
B. fuegiana (Mitt.) Jaeg., Falkland Is.; Fuegia; Patagon. austr.
B. lechleri C. Müll., Fret. Mag.
B. patagonica (Mitt.) Jaeg., Patagon.
B. perrubiginosa Dusén., Patagon. occ.
B. pusilla (Aongstr.) C. Müll., Fuegia; Fret. Mag.
B. robusta (Hook. & Grev.) Brid., Falkland Is.; Fuegia; Patagon. austr. et occ.

Fam. Grimmiaceæ.

Gen. GRIMMIA Ehrh.

Grimmia amblyophylla C. Müll., Hermite I.; Fret. Mag.
G. apocarpa (L.) Hedw., Hermite I.; Fret. Mag.
G. austro-leucophæa Besch., Fuegia.
G. depressa C. Müll., Staaten I.; Fuegia.
G. depressa C. Müll., var. *terrestris* C. Müll., Patagon. austr.
G. fallax Dusén, Patagon. austr.
G. humilis Mitt., Patagon. austr.

G. macropulvinata Dusén, Patagon. austr.
G. tortuosa Hook. f. & Wils., Falkland Is.

Gen. RHACOMITRIUM Brid.

Rhacomitrium heterostichum (Hedw.) Brid., Falkland Is.
R. lævigatum (Mitt.) Jaeg., Hermite I.; Fuegia; Patagon. occ.
R. lanuginosum (Hedw.) Brid., Falkland Is.; Hermite I.; Fuegia; Patagon. occ.
R. nigritum (C. Müll.) Jaeg., Hermite I.; Fuegia; Fret. Mag.; Patagon. occ.
R. protensum A. Br., Fuegia.
R. rupestre Hook. f. & Wils., Hermite I.; Fuegia.
R. sublamprocarpum (C. Müll.) Par., Fuegia.
R. subnigritum (C. Müll.) Par., Fuegia.
R. symphyodontum (C. Müll.) Par., Falkland Is.; Hermite I.; Fuegia; Patag. occ.

Gen. SCOULERIA Hook.

Scouleria patagonica (Mitt.) Jaeg., Patagon. occ.

Gen. PTYCHOMITRIUM Br. Eur.

Ptychomitrium ligulatum (Mitt.) Jaeg., Hermite I.; Fuegia.

Fam. Orthotrichaceæ.

Gen. ORTHOTRICHUM Hedw.

Orthotrichum compactum Dusén, Patagon. austr.
O. crassifolium Hook. f. & Wils., Falkland Is.; Staaten I.; Hermite I.; Fuegia.
O. elegantulum Sch., Fret. Mag.
O. macloskii Dusén, Patagon. austr.

Gen. ULOTA Brid.

Ulota crenato-erosa (C. Müll.) Par., Fuegia.
U. darwinii Mitt., Fuegia.
U. eremitensis Mitt., Hermite I.; Cape Horn; Fuegia.
U. fuegiana Mitt., Staaten I.; Hermite I.; Cape Horn; Fuegia.
U. fulvella Mitt., Fuegia; Patagon. occ.

U. glabella Mitt., Hermite I.
U. gymnomitria C. Müll., Patagon.
U. hamata Dusén, Patagon.
U. incana (C. Müll.) Par., Fuegia austr.; Fret. Mag.
U. inclinata (C. Müll.) Par., Fuegia.
U. leiothecia (C. Müll.) Jaeg., Fret. Mag.
U. lobbiana Mitt., Patagon.
U. macro-calycina (Mont.) Jaeg., Fret. Mag.
U. magellanica (Mont.) Jaeg., Fret. Mag.
U. phyllantha Brid., Hermite I.; Fuegia; Fret. Mag.
U. pygmiothecium (C. Müll.) Par., Fuegia.
U. savatieri Besch., Patagon. occ.

Gen. MACROMITRIUM Brid.

M. harioti Besch., Fuegia austral.
M. bifasciculare C. Müll. in herb., Fuegia austral.; Patagon. occ.
M. hymenostomum Mont., Cape Horn; Fuegia.
M. krausei Lor., Patagon. occ.
M. saddleanum Besch., Fuegia.
M. tenax C. Müll., Fret. Mag.; Patagon. occ.

Gen. SCHLOTHEIMIA Brid.

Schlotheimia gracillima Besch., Fuegia.

Gen. AMPHIDIUM Nees.

Amphidium cyathicarpum (Mont.), Patagon. occ.

Gen. ZYGODON Hook. & Tayl.

Zygodon curvicaulis Dusén, Patagon. occ.
Z. hyadesii Besch., Fuegia; Patagon. occ.
Z. hatcheri Dusén, Patagon. occ.

Gen. PENTASTICHELLA C. Müll.

Pentastichella pentasticha (Mont.) C. Müll., Patagon. occ.

Fam. EUSTICHIACEÆ.

Gen. EUSTICHIA C. Müll.

Eustichia longirostris (Brid.) C. Müll., Fret. Mag.; Patagon. occ.

Fam. Splachnaceæ.

Gen. DISSODON Grev. & Arn.

Dissodon magellanicus Hpe., Fuegia; Fret. Mag.; Patagon. occ.

Gen. TETRAPLODON Br. Eur.

Tetraplodon fuegianus Besch., Fuegia; Patagon. austr.

Gen. HYMENOCLEISTON Duby.

Hymenocleiston magellanicum Duby., Fuegia; Patagon. occ.
Hymenocleiston magellanicum var. *edenense*, Besch., Patagon. occ.

Fam. Funariaceæ.

Gen. FUNARIA Schreb.

Funaria hygrometrica (L.) Hedw., var. *fuegiana* C. Müll., Fuegia; Patagon. austr.

Fam. Bryaceæ.

Gen. MIELICHOFERIA Hornsch.

Mielichoferia spegazziniana C. Müll., Staaten I.

Gen. ORTHODONTIUM Schwaeger.

Orthodontium australe Hook. f. & Wils., Falkland Is.; Hermite I.; Fuegia.

Gen. BRACHYMENIUM Hook.

Brachymenium magellanicum (Sull.), Par., Fuegia.

Gen. LEPTOBRYUM Sch.

Leptobryum pyriforme (L.) Sch., Fuegia; Patagon. occ.
L. pottiaceum Dusén, Fuegia; Patagon. occ.

Gen. BRYUM Dill.

Bryum arenæ C. Müll., Fret. Mag.
B. bimum Schreb., Fuegia; Patagon. austr.
B. gemmatum C. Müll., Fuegia.

B. hatcheri Dusén, Patagon. austr.
B. lævigatum Hook. f. & Wils., Falkland Is., Hermite I.; Fuegia.
B. lamprochæte Dusén, Patagon. austr.
B. lonchochæte Dusén, Patagon. austr.
B. minusculum C. Müll., Fuegia.
B. rigochæte Dusén, Patagon. austr.
B. spegazzinii C. Müll., Fuegia.
B. vernicosum Dusén, Patagon. austr.

Gen. WEBERA Hedw.

Weber albicans (Wahlb.) Sch., Falkland Is.; Fuegia.
W. alticaulis (C. Müll.) Par., Fuegia; Patagon. occ.
W. cruda (L.) Schwaegr., Fuegia; Patagon. austr. et occ. (Syn. *W. synoico-cruda* C. Müll.)
W. nutans (Schreb.) Hedw., Falkland Is.; Hermite I.; Cape Horn; Fuegia.
W. sphagnadelphus (C. Müll.) Besch., Fuegia; Patagon. austr.
W. philonotea (C. Müll.) Par., Fuegia.

Fam. Mniaceæ.

Gen. MNIUM Dill.

Mnium leptolimbatum C. Müll., Patagon. austr.
M. rostratum Br. & Schimp., Falkland Is.; Fuegia; Patagon. austr. et occ.

Fam. Rhizogoniaceæ.

Gen. RHIZOGONIUM Brid.

Rhizogonium mnioides (Hook.) Sch., Hermite I.; Fuegia; Patagon. occ.
R. reticulatum (Hook. f. & Wils.) Mitt., Hermite I.; Fuegia; Patagon. austr.
R. subbasilare (Hook.) Sch., Hermite I.; Fuegia; Patagon. occ.

Fam. Leptostomaceæ.

Gen. LEPTOSTOMUM R. Br.

Leptostomum menziesii (Hook.) R. Br., Fuegia; Patagon. austr. et occ.

Gen. LEPTOTHECA Schwaegr.

Leptotheca gaudichaudii Schwaegr., Falkland Is.
L. spegazzinii C. Müll., Fuegia; Patagon. occ.

Fam. Aulacomniaceæ.

Gen. AULACOMNIUM Schwaegr.

Aulacomnium palustre (L.) Schwaegr., Patagon. austr.

Fam. Bartramiaceæ.

Gen. BARTRAMIA Hedw.

Bartramia aristata Sch., Fuegia austr.
B. magellanica Aongstr., Fuegia; Patagon. austr. et occ.
B. patens Brid., Falkland Is.; Staaten I.; Fuegia; Patagon. occ.
B. pomiformis (L.) Hedw., Fuegia; Fret. Mag.
B. ityphylla var. *arenæ* Besch., Patagon. austr.

Gen. BARTRAMIDULA Br. Eur.

Bartramidula exigua (Sull.) Jaeg., Fuegia; Patagon. austr. et occ.

Gen. CONOSTOMUM Sw.

Conostomum australe Sw., Falkland Is.; Hermite I.; Fuegia.
C. magellanicum Sull., Fuegia.

Gen. BREUTELIA Sch.

Breutelia aureola Besch., Patagon. occ.
B. brachycoma Besch., Patagon. occ.
B. dumosa Mitt., Hermite I.; Fuegia; Patagon. occ.
B. elongata Hook. f. & Wils., Fret. Mag. occ.; Patagon. occ.
B. hariotiana Besch., Hermite I.; Fuegia; Patagon. occ.
B. pendula (Hook.) Jaeg., Hermite I.; Fuegia.
B. plicata Mitt., Fret. Mag. occ.; Patagon. occ.
B. robusta (Hook. f. & Wils.) Jaeg., Fuegia.
B. rupestris (Mitt.) Jaeg., Hermite I.; Fuegia.

Gen. PHILONOTIS Brid.

Philonotis nigroflava C. Müll., Patagon. austr.
P. parallela Dusén, Patagon. austr. et occ.
P. vagans (Hook. f. & Wils.) Mitt., Fuegia; Patagon. occ.

Fam. Polytrichaceæ.

Gen. POLYTRICHADELPHUS C. Müll.

Polytrichadelphus dendroides (Hedw.) Mitt., Hermite I.; Fuegia; Patagon. occ.
P. magellanicus (L.) Mitt., Falkland I.; Fuegia; Patagon. austr. et occ.
P. squamosa (Hook. f. & Wils.) Mitt., Hermite I.; Falkland Is.; Fuegia.

Gen. POLYTRICHUM Dill.

Polytrichum elongatum P. B., Fret. Mag.
P. juniperinum Hedw., Hermite I.; Cape Horn; Falkland Is.; Fuegia; Patagon.
P. patagonicum C. Müll., Fuegia; Patagon.
P. piliferum Schreb., Falkland Is.; Cape Horn; Fuegia; Patagon.
P. strictum Banks, Fuegia; Patagon.
P. trachynotum C. Müll., Fuegia.
P. spegazzinii C. Müll., Fuegia austr.

Gen. PSILOPILUM Brid.

Psilopilum compressum (Hook. f. & Wils.) Mitt., Hermite I.; Fuegia.

PLEUROCARPINEÆ.

Fam. Rhacocarpaceæ.

Gen. RHACOCARPUS Lindl.

Rhacocarpus humboldti (Spreng.) Lindb., Falkland Is.; Hermite I.; Fuegia; Fret. Mag. occ.; Patagon. occ.

Fam. Cryphæaceæ.

Gen. CRYPHÆA Brid.

Cryphæa consimilis Mont., Patagon. occ.
C. tenella Mitt., Patagon. occ., Lago Nahuel-huapi.

Gen. DENDROCRYPHÆA Par. & Sch.

Dendrocryphæa gorveana (Mont.) Par., Patagon. occ.

Fam. Leptodontaceæ.

Gen. LEPTODON Mohr.

Leptodon smithii (Dicks.) Mohr., Patagon. occ., Lago Nahuel-huapi.

Fam. Leucodontaceæ.

Gen. LEPYRODON Hpe.

Lepyrodon implexus (Kze.) Par., Fuegia; Patagon. austr. et occ.
L. lagurus (Hook.) Mitt., Fuegia; Patagon. austr. et occ.

Fam. Neckeraceæ.

Gen. PILOTRICHELLA C. Müll.

Pilotrichella cumingii (C. Müll.) Lor., Patagon. occ.
P. krausei Lor., Patagon. occ.

Gen. NECKERA Hedw.

Neckera chilensis Mitt., Patagon. occ.
N. scabridens C. Müll., Patagon. occ.

Gen. THAMNIUM Br. Eur.

Thamnium arbusculans C. Müll. in herb., Fuegia; Patagon. occ.
T. decumbens Besch., Fret. Mag.

Fam. Hookeriaceæ.

Gen. MNIADELPHUS C. Müll.

Mniadelphus flaccidus (Hook. f. & Wils.) Hpe., Hermite I.; Fuegia.
M. krausei Lor., Fuegia; Fret. Mag. occ.; Patagon. occ.

Gen. CYATHOPHORUM P. Beauv.

Cyathophorum splendidissimum (Mont.) Hpe. & Lor., Patagon. occ.

Gen. ERIOPUS Brid.

Eriopus apiculatus (Hook. f. & Wils.) Mitt., Hermite I.; Fuegia.

Gen. HOOKERIA Sm.

Hookeria ancistroides Mont., Patagon. occ.

Gen. DISTICHOPHYLLUM Dz. & Mitt.

Distichophyllum dicksoni (Hook.) Mitt., Falkland Is.; Hermite I.; Fuegia.
D. eremitæ (C. Müll.) Jaeg., Hermite I.; Fuegia.
D. molle Besch., Fuegia.
D. nigricans Besch., Fuegia.
D. patagonicum Besch., Patagon. occ.

Gen. PTERYGOPHYLLUM Brid.

Pterygophyllum anomalum (Schwaegr.) Mitt., Hermite I.
P. denticulatum (Hook. f. & Wils.) Mitt., Falkland Is.; Hermite I.
P. magellanicum Besch., Fret. Mag. occ.; Patagon. occ.
P. obscurum (Mont.) Mitt., Fuegia; Patagon. occ.

Fam. Leskeaceæ.

Gen. LESKEA Hedw.

Leskea fuegiana Besch., Fuegia; Patagon. austr. et occ.

Fam. Stereodontaceæ.

Gen. ACROCLADIUM Mitt.

Acrocladium auriculatum Mitt., Fuegia; Patagon. austr. et occ.
A. chlamydophyllum (Hook. f. & Wils.), Fuegia; Patagon. austr. et occ.
A. (?) *morenoi* C. Müll., Patagon. occ.

Gen. CATAGONIUM C. Müll.

Catagonium politum (Hook. f. & Wils.) C. Müll., Hermite I.; Fuegia; Patagon. austr. et occ.

Gen. PLAGIOTHECIUM Br. Eur.

Plagiothecium leptoplumosum Dusén, Fuegia; Patagon. occ.
P. lucidulum (Hook. f. & Wils.) Mitt., Falkland Is.; Hermite I.; Fuegia.
P. magellanicum (C. Müll.), Fuegia austr.

Gen. STEREODON (Brid.) Mitt.

Stereodon lechleri (C. Müll.), Patagon. occ.
S. nitidus (Hook. f. & Wils.), Staaten I.; Hermite I.; Fuegia.

Gen. PTYCHOMNIUM Mitt.

Ptychomnium aciculare (Brid.) Mitt., Fuegia; Patagon. occ.
P. cygnisetum (C. Müll.) Par., Fuegia; Patagon. occ.
P. ptychocarpon (Schwaegr.) Mitt., Patagon. occ.
P. subaciculare Besch., Patagon. occ.

Gen. CLADOMNIUM Hook. f. & Wils.

Cladomnium gracile (Hpe.) Mitt., Patagon. occ.

Fam. Sematophyllaceæ.

Gen. RHAPHIDOSTEGIUM Br. Eur.

Rhaphidostegium amœnum (Hedw.) Par., Hermite I.; Fuegia.
R. callidum (Mont.) Jaeg., Patagon. occ.
R. leucocyton (C. Müll.) Jaeg., Hermite I.
R. noduliferum (Mitt.) Jaeg., Hermite I.; Fuegia.
R. pallens (Sch.), Fuegia; Patagon. occ.
R. secundifolium (C. Müll.) Jaeg., Hermite I.; Fuegia.

Fam. Hypnaceæ.

Gen. BRACHYTHECIUM Br. Eur.

Brachythecium longidens (C. Müll.) Par., Fuegia.
B. morenoi C. Müll., Patagon. austr.
B. paradoxum (Hook. f. & Wils.) Besch., Hermite I.; Fuegia; Patagon. austr. et occ.
B. sericeo-virens (C. Müll.) Par., Fuegia.
B. spegazzinii (C. Müll.) Par., Fret. Mag.
B. spurio-albicans C. Müll., Patagon. austr.
B. subpilosum (Hook. f. & Wils.) Par., Falkland Is.

Gen. ERIODON Mont.

Eriodon conostomus Mont., Patagon. occ.

Gen. RIGODIUM Kze.

Rigodium nano-fasciculatum C. Müll., Patagon. occ.
R. tamarix C. Müll., Fuegia.
R. toxarion (Schwaegr.) Sch., Patagon. occ.

Gen. SCIAROMIUM Mitt.

Sciaromium confluens (C. Müll.) Par., Patagon. austr. et occ.
S. depastum Dusén, Fuegia austr.

Gen. STEREOPHYLLUM Mitt.

Stereophyllum fuegianum Besch., Hermite I.; Fuegia.

Gen. AMBLYSTEGIUM.

Amblystegium uncinatum De Not.; var. *symmetricum* (Ren. et Card.), Fueg.; Patagon. occ.

Gen. HYPNUM Dill.

Hypnum austro-uncinatum C. Müll., Patagon. occ.
H. fluitans L. var. *laculosa* (C. Müll.) Par., Staaten I
H. fuegianum (Mitt.) C. Müll., Hermite I.; Fuegia.
H. longifolium (Mitt.) Jaeg., Falkland Is.
H. uncinatum Hedw., Fuegia; Patagon. occ.
H. perplicatum Dusén, Fret. Mag.

Gen. HYPNODENDRON C. Müll.

Hypnodendron krausei (C. Müll.) Jaeg., Patagon. occ.

Fam. Hypopterygiaceæ.

Gen. HYPOPTERYGIUM Brid.

Hypopterygium didictyon C. Müll., Hermite I.; Fuegia; Patagon. occ.
H. flexisetum Hpe., Patagon. occ.
H. thouinii Mont., Fuegia; Patagon. occ.

B. UNDESCRIBED SPECIES (EXAMINED AND NAMED, BUT THE DESCRIPTIONS NOT YET PUBLISHED).

SPHAGNALES.

Fam. Sphagnaceæ.

Gen. SPHAGNUM Dill.

Sphagnum rigescens Warmst., Fret. Mag. occ.

ANDREÆALES.

Fam. Andreæaceæ.

Gen. ANDREÆA Ehrh.

Andreæa loricata Dusén, Fuegia.
A. pachyphylla (C. Müll.) Dusén, Fuegia. (Syn. *Grimmia pachyphylla* C. Müll.)
A. pulvinatula Dusén, Fuegia.
A. purpurascens Dusén, Fuegia.
A. vermicularis Dusén, Fuegia.

Bryales.

ACROCARPINEÆ.

Fam. Dicranaceæ.

Subfam. *DICRANELLEÆ.*

Gen. ANISOTHECIUM Mitt.

Anisothecium persquarrosum Dusén, Patagon. occ.

Subfam. *DICRANEÆ.*

Gen. DICRANOWEISIA Lindb.

Dicranoweisia tenella Dusén, Patagon. occ.

Gen. DICRANUM Hedw.

Dicranum capillifolium Broth., Patagon. occ.
D. grandialare Dusén, Patagon. occ.
D. percompactum Dusén, Fret. Mag. occ.
D. perremotifolium Dusén, Patagon. occ.
D. peruncinatum Dusén, Patagon. austr.

Gen. CAMPYLOPUS Brid.

Campylopus flavo-nigritus Dusén, Fret. Mag. occ.; Patagon. occ.
C. occultoviridis Dusén, Fret. Mag. occ., Patagon. occ.
C. patagonicus Broth., Patagon. occ.
C. purpureocaulis Dusén mus., Fret. Mag. occ.
C. sordidonigritus Dusén mus., Fret. Mag. occ.
C. sulphureo-nigritus Dusén mus., Patagon. occ.

Subfam. *SELIGERIEÆ.*

Gen. BLINDIA Br. Eur.

Blindia globularis Dusén mus., Patagon. occ.
B. pseudo-robusta Dusén mus., Fret. Mag. occ.
B. sulphurea Dusén mus., Patagon. occ.

Fam. Pottiaceæ.

Subfam. *POTTIEÆ.*

Gen. BARBULA Hedw.

Barbula brachychæta Dusén mus., Patagon. occ.
B. flavido-pilosa Dusén mus., Patagon. occ.
B. marginato-serrata Dusén mus., Patagon. occ.
B. micro-runcinata Dusén mus., Patagon. occ.
B. nanophylla Dusén mus., Patagon. occ.
B. perangusta Dusén mus., Patagon. austr.

Subfam. *EUCALYPTEÆ.*

Gen. EUCALYPTA Schreb.

Eucalypta patagonica Broth. mus., Patagon. austr.

Fam. Grimmiaceæ.

Gen. GRIMMIA Ehrh.

Grimmia arachnoidea Dusén mus., Patagon. occ.
G. flexiseta Dusén mus., Patagon. occ.
G. pycnophylla Dusén mus., Patagon. occ.

Gen. RHACOMITRIUM Brid.

Rhacomitrium flavo-pallidum Dusén mus., Fuegia, Patagon. occ.

Fam. Orthotrichaceæ.

Gen. ORTHOTRICHUM Hedw.

Orthotrichum angustissimum Dusén mus., Patagon. occ.
O. hymenomitrium Dusén mus., Patagon. austr.
O. ligulatum Dusén mus., Fret. Mag. occ.
O. nigritellum Dusén mus., Patagon. occ.
O. paleomitrium Dusén mus., Patagon. austr.
O. perpusillum Dusén mus., Patagon. occ.
O. subassimile Dusén mus., Patagon. occ.

Gen. ULOTA Brid.

Ulota macrodonta Dusén mus., Patagon. occ.
U. persubulata Dusén mus., Patagon. occ.

Gen. MACROMITRIUM Brid.

Macromitrium spurio-crispulum Dusén mus., Patagon. occ.
M. sub-piliferum Dusén mus., Patagon. occ.

Gen. ZYGODON Hook. & Tayl.

Zydodon gracillimus Dusén mus., Patagon. occ.

Gen. PENTASTICHELLA C. Müll.

Pentastichella aurea Dusén, Patagon. occ.

Fam. Bryaceæ.

Gen. BRYUM Dill.

Bryum ærugo Dusén mus., Fuegia.
B. anisodontaceum Dusén mus., Patagon. occ.

B. brevigemmatum Dusén mus., Patagon. occ.
B. demissum Dusén mus.
B. flavo-pallidum Dusén mus., Fuegia orientalis.
B. hamatum Dusén mus., Fret. Mag. occ.; Patagon. occ.
B. leuco-aristatum Dusén mus., Patagon. austr.
B. liliputanum Dusén mus., Patagon. occ.
B. myurella Dusén mus., Fuegia austr.
B. tenuirete Dusén mus., Patagon. occ.

Gen. WEBERA Hedw.

Webera timmiæcaulon Dusén mus., Fuegia; Patagon. occ.

Fam. Bartramiaceæ.

Gen. ANACOLIA Schr.

Anacolia aurea Dusén mus., Patagon. occ.

Gen. BREUTELIA Sch.

Breutelia subelongata Broth. mus., Fuegia; Patagon. occ.
B. glabrifolia Dusén mus., Patagon. occ.

Fam. Polytrichaceæ.

Gen. POLYTRICHUM C. Müll.

Gen. POLYTRICHADELPHUS C. Müll.

Polytrichadelphus stricticaulis Dusén mus., Patagon. occ.

Pleurocarpineæ.

Fam. Cryphæaceæ.

Gen. CRYPHÆA Brid.

Cryphæa mollis Dusén mus., Patagon. occ.

Fam. Hookeriaceæ.

Gen. DALTONIA Hook. & Tayl.

Daltonia patagonica Dusén mus., Patagon. occ.

Gen. ERIOPUS C. Müll. in herb.

Eriopus odontoloma C. Müll. in herb., Patagon. occ.

Gen. DISTICHOPHYLLUM Dz. & Mitt.

Distichophyllum crispatissimum Dusén mus., Patagon. occ.

Gen. PTERYGOPHYLLUM Brid.

Pterygophyllum lamellatum Dusén mus., Patagon. occ.

Fam. Leskeaceæ.

Gen. THUIDIUM Br. Eur.

Thuidium corralense Broth. mus., Fuegia austr.

Fam. Stereodontaceæ.

Gen. ECTROPOTHECIUM Mitt.

Ectropothecium spirifolium Dusén mus., Patagon. occ.

Gen. CLADOMNIUM Hook. fil. & Wils.

Cladomnium crenato-obtusum Dusén mus., Patagon. occ.

Fam. Sematophyllaceæ.

Gen. RHAPHIDOSTEGIUM Br. Eur.

Rhaphidostegium berberidis Dusén mus., Patagon. occ.
R. patagonicum Broth. mus., Patagon. occ.
R. polytrichadelphum Dusén mus., Patagon. occ.
R. strictipes Dusén mus., Patagon. occ.
R. tristifolium Dusén mus., Patagon. austr.

Fam. Hypnaceæ.

Gen. ISOTHECIUM Brid.

Isothecium serpens Dusén mus., Patagon. occ.

Gen. BRACHYTHECIUM Br. Eur.

Brachythecium cuspidarioides Dusén mus., Patagon. occ.
B. majusculum Dusén mus., Fuegia; Fret. Mag.
B. subtilicaule Dusén mus., Patagon. occ.
B. turgens Dusén mus., Fuegia austr.

Gen. RHYNCHOSTEGIUM Br. Eur.

Rhynchostegium byssicladum Dusén mus., Patagon. occ.
R. mollissimum Dusén mus., Patagon. occ.

Gen. RIGODIUM Kze.

Rigodium pseudo-thuidium Dusén mus., Patagon. occ.
R. carnosulum Dusén mus., Patagon. occ.

Gen. AMBLYSTEGIUM Br. Eur.

Amblystegium megachæte Dusén mus., Fuegia occ.

(Incertæ Sedis.)

Family CHARACEÆ. Stoneworts.

Aquatic cellular plants with segmented stems, the internode having one long axial cell, and the node consisting of several short cells. Whorled leaves, sometimes with axillary branches, arise from the node, and are themselves segmented and leaf-bearing; also bearing sexual reproductive organs at their nodes. Antheridia globular, bearing in their interior bundles of jointed filaments which produce many coiled and ciliated spermatozoids. Oögonia ovoid, consisting of 5 filaments spirally wound around a single egg-cell, and surmounted by crown-cells.

Species 160, in fresh or brackish water.

CHARA Linn.

Stem and leaves usually corticated by longitudinal cells, often becoming encrusted with lime. Spore-sac above antheridium. Crown-cells 5,

C. fœtida A. Braun (*C. vulgaris* Linn. p. p.).

Cortical tubules twice as many as the leaves. Whorls about 8-leaved; stipular circle double, weak.

South Patagonia: by J. B. Hatcher, near Rio de la Santa Cruz. Determined by the late T. F. Allen.

(Nearly cosmopolitan: as is *C. fragilis* Desv. the other section of *C. vulgaris* L., distinguished by its cortical tubules thrice as many as the leaves. Both are much encrusted and fragile.)

PTERIDOPHYTA, FERNS AND FERNLIKE PLANTS.

BY

G. MACLOSKIE.

(Determinations by Lucien M. Underwood.)

Family 1. Ophioglossaceæ. Adder's-tongue.

More or less succulent plants consisting of a stem and leaf growing from a fleshy root. Sporesacs without annulus, crowded in one or more spikes or panicles, and opening by a transverse slit.

CHIROGLOSSA Presl. (Section of *Ophioglossum.*)

Frond broad, to 30 cm., palmately lobed. Spikes with 2-ranked sporesacs, several on base of frond and stipe.

C. palmata (Linn.).

Fig. in Engl. & Pr. i. 4. p. 478 B.

(W. Indies; Brazil; Bourbon I.); Patagonia.

BOTRYCHIUM Swartz.

Rootstocks fleshy, clustered. Frond pinnately parted. Fruit 1–3-pinnate, with rows of sessile sporesacs.

B. lunaria (L.) Sw. Moonwort.

Frond pinnately divided into fan-shaped segments, 10 cm. high.

Fig. in Britt. & Br. i. p. 3; Eng. & Pr. i. 4, p. 457.

S. Patagon., by Hatcher, "a var., or possibly an undescribed species, but the material insufficient." (L. M. Underwood.)

Fam. 2. Hymenophyllaceæ. Filmy-ferns.

Membranaceous, small, with slender creeping rootstocks. Leaves much divided. Sporesacs on marginal, usually elongated receptacles; with horizontal ring, and opening apically.

Species chiefly tropical; also many in New Zealand, and some in temperate climates.

TRICHOMANES Linn.

Indusium tubular or cuplike, sometimes 2-lipped.

Species 100, mostly tropical.

T. CÆSPITOSUM (Gaud.) Hook. (*Serpyllopsis antarctica* Besch.)

Frond once-pinnate, 5 cm. high; pinnæ small, entire, their surface horizontal, their rachis not winged. Reddish hairs on stipe and veins.

Patagonia to Cape Horn; Falklands. "Common on trunks of trees."

T. FLABELLATUM Bory.

Frond fan-shaped, orbicular, palmately divided halfway; the ultimate lobes short, linear, entire, 5 cm. high.

Falklands.

HYMENOPHYLLUM Linn.

Indusium 2-valved, receptacle not protruding.

Species at least 100, chiefly tropical.

H. ABRUPTUM Hook. f.

Glabrous, 25 mm. high. Frond oval-triangular, once-pinnatifid; pinnæ at most simply forked. Main rachis broad-winged below.

(W. Indies; Brazil); Patagon.; Clarence I. (var. *brevifrons*).

H. ÆRUGINOSUM Carm.

10 cm. Stipe tomentose. Frond thrice pinnatifid, pubescent. Main rachis winged above. Ultimate segments linear with terminal sori.

(Tristan); W. Magellan.

H. BRIDGESII Hook.

12 cm. Frond ovate-triangular, thrice-pinnate. Rachis slightly winged above. Ultimate segments narrow-linear, rigid, not crisped, spinulose-toothed. Sori at base of pinnules.

(Melville I.); Fuegia (by Dusén).

H. CÆSPITOSUM Christ.

Low, densely cespitose, 2–3 cm. Its 12–15 pinnæ spirally arranged, simple or bipartite. Sori?

W. Patagon.; S. Fuegia (by Dusén).

H. CAUDICULATUM (Mart.) var. CAUDATUM Bosch.

Stipe to 15 cm., broad-winged above. Frond thrice-pinnatifid; main rachis with a crisp wing; var. also with the secondary rachis winged. Sori apical on the segments.

Chonos Archip. S. Patagonia, Otway.

H. CRUENTUM Cav.

10 cm. Frond simple, sinuate, glabrous. Sori at apex of the sinuations.

Fig. in Eng. & Pr. i. 4. p. 109. A. Patagonia, Otway.

H. DICHOTOMUM Cav.

To 20 cm. Frond and segments crisped, twice to thrice-pinnatifid. Stipe and rachis winged. Ultimate segments broad-linear. Sori in their axils. Valves of indusium spinose.

(Chili); W. Magellan. Otway.

H. DICRANOTRICHUM (Presl.). (*H. chiloënse* Hook.)

7 cm. Frond ciliated, hairy, twice-pinnatifid. Rachis zigzag, ciliated and winged. Stipe not winged. Sori singly at base of pinnæ, only on the upper side.

Chonos Archip.; Chiloe; Otway.

H. DUSENII Christ.

Mosslike, cespitose, 5 mm. high. Frond once-pinnate; pinnæ pectinate; their segments ligulate-linear, with rufous apex and dark single nerve. Margin ciliate. Sori?

W. Magellan; S. Fuegia at 500 meters elevation.

H. FALKLANDICUM Baker.

4 cm. Stipe filiform. Frond not crisped, twice-pinnatifid. Rachis flexuous, filiform; ultimate lobes ligulate, ciliate-toothed. Sori solitary at base of upper pinnæ.

Falklands.

H. MAGELLANICUM (Desv. sub *Didymoglossum*) Hook. & Bak.

To 20 cm. Stipe and rachis winged throughout. Frond thrice-pinnatifid; its ultimate segments spinulose-toothed. Sori 6–10, terminal.

(Chili; Organ Mts.); Chiloe; W. Magellan, Churucca, on old trees.

H. NIGRICANS Colla. (*H. tortuosum* Hook., non Banks.)

15 cm. Stipe wiry, it and rachis winged throughout. Frond crisped, broad ovate-triangular, thrice-pinnatifid. Ultimate segments linear, toothed. Sori 10–∞, terminal on the pinnules.

(Chili); Patagon., and adjacent Is., to Cape Horn.

H. PECTINATUM Cav.

To 18 cm. Stipes wiry. Fronds pinnate: rachis winged next apex. Pinnæ winged on lower, pectinate on upper side. Sori terminal on proximal segments of upper side. Beautiful.

Chonos Archip.; W. Magellan., "common on trunks of trees and rotting wood." (Dusén.) Patagonia, Churucca.

H. PELTATUM Poir. ("oldest name" W. J. Hook.). (*H. tunbridgense* Sm. var. *wilsoni* Hook.)

5 cm. Frond pinnate; the pinnæ distichous, and pinnatifid on their upper side only. Margins spinulose-toothed. Rachis and upper part of stipe winged.

(Norway; British Isles; Australia; N. Zeal.; Chili); Chonos to Cape Horn; Falklands.

H. RARUM Br. (*H. darwinii* Hook.)

12 cm. Glabrous. Twice-pinnatifid; with winged rachis. Sori large, terminal on the broad segments.

(S. Afr., Tasmania; N. Zeal.); Patag., Fuegia; Falklands; Staaten I.

H. SECUNDUM Hook. & Grev.

8 cm. Frond pinnate; pinnæ recurved, flabellate-pinnatifid. Ultimate segments linear-spinulose-toothed, falcate, secund. Sori solitary at base of pinnæ on upper side.

W. Magellan., on mossy soil in woods near Churucca. Fuegia to Cape Horn; Staaten I.

H. SUBTILISSIMUM Kunze.

20 cm. Stipe wiry, tomentose. Frond hairy, thrice-pinnatifid. Rachis slightly winged above. Ultimate segments broad-linear, with copious tawny stellate hairs. Sori terminal.

(New Zealand; Chili; Fernandez); Chiloe; Patagonia, Otway; Fuegia to I. Hoste.

H. TORTUOSUM Banks & Sol.

15 cm. Stipe and rachis winged. Frond crisped, thrice-pinnatifid. Ultimate segments linear, toothed and wavy. Sori numerous, terminal on the segments.

Chonos Archip., Fuegia throughout; S. Patagonia (by Hatcher).

Fam. 3. CYATHEACEÆ.

Mostly tree-ferns with large compound fronds. Sessile or stalked sporesacs, with complete ring, obovoid and crowded on a convex receptacle, opening by a transverse slit.

Chiefly tropical; also in colder parts of S. Amer. and in Tasmania and New Zealand.

ALSOPHILA R. Br.

Sori globose, dorsal on a vein or the forking of a vein, mostly hairy. Indusium none.

Species 150, S. America; Africa; Pacific Is.

A. PRUINATA Kaulf.

Thrice-pinnate; pinnæ 40 cm. long, hoary, white underneath. Leaf-stalks woolly. Sori solitary near the chief nerves, one or more to each lobule.

Mex. and W. Indies; S. Amer. (Fig. in Eng. & Pr. i. 4. p. 133. C.) Patagonia, Otway (Savatier). "Not previously observed south of Juan Fernandez I. Its occurrence in Patagonia is a very interesting fact" (A. Franchet).

Fam. 4. POLYPODIACEÆ.

Ferns of varying habit, coiled in vernation. Sporesacs mostly with incomplete vertical rings, opening transversely; stalked; their clusters (sori) on the underside of the fronds, or on contracted fronds; mostly with an indusium.

Species about 3000, cosmopolitan.

BLECHNUM Linn.

Sori in continuous lines, not marginal, one on each side of the midrib, with a continuous indusium, which opens towards the midrib. Veins forked.

Species 20, chiefly trop. and s. temp.

B. PINNA-MARINA (Poir.) Mitt. (*Lomaria alpina* Spr.)

Rhizome slender, wide-creeping. Frond 15 cm. long, pinnate; the pinnæ 12 mm. long, 3 mm. broad, obtuse. Fertile frond longer than the barren.

(N. Zeal.; Austral.; Kerguel.; Tristan; Brazil); Magellan; Fuegia to Cape Horn; Falklands; S. Patagonia (by Hatcher).

B. TABULARE (Thun.) Kuhn. (*Lomaria magellanica* Desv.)

Stout, 30–60 cm. high. Barren frond ovate, with small pinnæ. Fertile pinnæ linear, close. Often shortly treelike, the stem covered with linear-sagittate scales. Indusium fimbriated.

(S. Afr., Mascarenes; Tristan); W. Indies to Fuegia. Patagonia, at Puerto Bueno.

ASPLENIUM Linn.

Sori linear to oblong, with indusia of the same shape, oblique and opening towards the midnerve.

Species 350, widely distributed.

A. MAGELLANICUM Kaulf.

Stems tufted, wiry, ebeneous below, 8 cm. Frond deltoid, pinnate, and the lower pinnæ pinnate, and twice pinnately divided, with incised-serrate segments. Sori copious, at length covering all the surface.

Magellan; Fuegia to Cape Horn; S. Patagonia (by Hatcher).

A. MULTIFIDUM Brack.

Stout. Frond ample, to 60 cm. across, subdeltoid, 4 times pinnate. Ultimate segments oblong-spatulate, toothed. Sori marginal, 1 to each division.

S. Fuegia (allied forms in S. Afr., Austral., N. Zeal., and Hawaii).

DRYOPTERIS Adans. 1763. Shield-ferns.

(*Aspidium* Sw. 1800. *Polystichum* Roth. 1797.)

Ferns with round sori, and peltate or cordate-reniform indusia, these fixed by the sinus or center. Fertile and sterile fronds similar. Stipe

not articulated on the rhizome. Sporesacs with incomplete vertical ring, bursting transversely.

Species 350, widely distributed.

D. ACULEATA (L.) O. Kuntze.

To 1 meter. Frond ovate-lanceolate, once-pinnate, and the lower pinnæ again pinnate; coriaceous, evergreen. Teeth awned. Scales on stalk and rachis. Sori in 2 rows near midveins.

Fig. in Eng. & Pr. i. 4, p. 192 A.

Cosmopolitan; rare in U. S. S. Patagonia (by Hatcher).

D. ADIANTIFORMIS (Forst. 1786) O. Kuntze.

(*Polypodium coriaceum* Sw. 1788.)

Frond subdeltoid, 60 by 40 cm., once-pinnate and the lower pinnæ twice-pinnatifid, the teeth not mucronate. Rachis polished. Sori broad, in 2 rows, filling nearly all the space.

(New Zealand & Pacific Is.; Austral.; Mascarenes; S. Africa; Cuba to Patagonia); S. Patagonia by R. Sta Cruz; Lago Argentino; Fuegia, Beagle Canal.

D. MOHRIOIDES (Bory) O. Kuntze.

Stout, 25 cm. high. Frond once-pinnate, and the lower pinnæ again pinnate, the segments obtuse, not awned, slightly toothed. Stem and rachis scaly. Sori copious.

(Marion I., Chili); Patagonia; W. Magellan at an elevation of 500 meters (Dusén).

D. VESTITA (Forst.).

To 50 cm. Pinnæ once-pinnate, and the lower pinnæ again pinnate. Rachis with red-brown fibrillæ and dark brown scales. Teeth awned. Sori 2-seriate, nearer the midnerve.

(Tasmania; Auckland Is.); S. Fuegia.

FILIX Adans. 1763. (*Cystopteris* Bern. 1811.)

Fronds all flat. Sori roundish; indusium partly inferior, fixed by a broad base, and enclosing the sorus as a hood.

Species 5, chiefly in northern zone.

F. FRAGILIS (Linn. sub *Polypodium*).

Rhizome short, densely leaved, 25 cm. high. Frond ovate-lanceolate, thrice-pinnatifid; rachis winged above. Ultimate segments rather long, toothed. Sori 2–12 to a pinnule, indusia early withering.

Fig. in Eng. & Pr. i. 4, p. 163 A-C; Britt. & Br. i. p. 13.

(In cold climates, and tropical mountains, nearly cosmopolitan); Magellan; S. Fuegia; Falklands.

POLYPODIUM Linn.

Fronds articulate on the rhizome, usually all similar, simple or pinnate. Sori round or nearly so, without indusium. Sporesacs with vertical ring, opening transversely.

Species 350, mostly tropical.

P. AUSTRALE (Br.) Mett. (*Grammitis australis* Br.)

Rhizome short, creeping, scaly. Fronds fasciculate, their stipes short, their laminæ 15 cm. long, 1.5 cm. broad, spatulate. Sori rather long, near the midnerve.

(Austral., New Zealand at 1,500 meters elevation; Marion I.; New Caled.; Tristan); Patagonia; W. Magellan, in Desolation I. on stems of trees (Dusén); Fuegia, Camden I.

P. AUSTRALE NANUM Brack.

Densely cespitose. Fronds only 10–15 mm. long, stipe included.

W. Magellan, heights near Packsaddle Anchorage.

Fam. 5. GLEICHENIACEÆ.

Sori terminal, dorsal, or on the ends of the veins, small, of few sessile or subsessile sporesacs, and with no indusium. Ring transverse, complete; sporesacs opening by vertical slits. Veins free.

Species 26, tropical, and southern.

GLEICHENIA Smith.

Rhizome creeping. Leaves usually spreading, veins forked.

Species 25.

G. CRYPTOCARPA Hook.

Frond proliferous with yellow-brown branches, dichotomously fan-shaped. Pinnæ pectinate; their segments narrow-linear, with involute margin concealing the sori.

Chili; Chiloe; Falklands.

G. QUADRIPARTITA Hook. (*G. acutifolia* Hook.)

Frond black when dry, reddish underneath, and chaffy on the costæ, not proliferous, but once forking, and each branch fanways dichotomous. Pinnæ lanceolate, acuminate, falcate, pectinate, 12 cm. long.

Magellan, at Port Famine, & W. Magellan, Churucca.

Fam. 6. SCHIZÆACEÆ.

Leaves simple or pinnate. Sporesacs in spikes or panicles, ovoid, sessile, with a small apical ring, opening by a vertical slit.

Species 75, mostly tropical.

SCHIZÆA Smith.

Small, slender ferns with filiform, linear fronds; the fertile longer than the sterile, bearing close distichous spikes.

Species 16.

S. AUSTRALIS Gaud.

Fronds not forked, wiry, subterete, 4 cm. long by .5 mm. broad, channeled in front. Fertile frond with about 6 short spreading spikes on each side.

(Auckland Is. "Common on hard soil where nothing else grows save lichens." J. D. Hooker); Falklands.

Fam. 7. SALVINIACEÆ. Water-ferns.

Small floating plants, with 2-ranked leaves on an axis circinately developed, and 1-celled sporesacs having a central receptacle, megasporangia and micro-sporangia in different fruits.

Species 20, widely distributed.

AZOLLA Lam.

Leaves minute, 2-lobed, a larger floating and a smaller submerged lobe on pinnately branching stems. Masses of microspores with glochidia.

Species 5.

A. FILICULOIDES Lam. (*A. magellanica* Willd.)

Racemosely branching; a root on every branch. Upper leaf-lobes with 1-celled, broadly based hairs. Leaves closely imbricating, oblong, obtuse, membranaceous margined, not reddish.

Figs. in Engl. & Pr. i. 4, pp. 385, 388, 396, 397.

(California to Chili, Brazil, & Patagonia); S. Patagonia, in stagnant waters.

Magellan; Falklands.

A. caroliniana W. (of N. America, to Calif. and by New Mexico to S. America) has spreading leaves, reddish below, not membranaceous at the margin. (Vid. in B. & B., I, p. 35.)

Fam. 8. EQUISETACEÆ. Horsetails.

Erect plants with jointed hollow and fluted stems, having whorled branches and leaves reduced to sheaths at the joints. Sporesacs 1-celled, suspended under the peltate polygonal scales of the terminal cone-like spikes. Spores of one kind, with 4 club-shaped elaters.

Species 25, widely distributed.

EQUISETUM Linn.

The only genus at present existing.

E. RAMOSISSIMUM H. B. & K.

Stems erect, to 1.5 meters tall, terete, as thick as the little finger, the ribs swollen, not angulate; sub-simply branching, the branches 6–10 at each joint, glabrous, hexagonal, themselves with one or two branchlets. Rows of stomata 1–4 in the same plant. Teeth of sheaths spreading, membranaceous, whitish, acute.

(Widely distributed. Got by Trelease in the Azores; Caraccas); at Bahia Blanca, and probably in N. Patagonia (may be that seen by Hatcher in Laguna Leona, Vol. I, p. 41).

Fam. 9. LYCOPODIACEÆ. Clubmosses.

Mosslike erect or trailing land plants with dichotomously dividing axes ending in spikes. Sporecases in the leaf-axils of the spikes, spores all of one kind, without elaters.

Species existing above 100; abounding most in the Andes and Himalehs; some are cosmopolitan.

LYCOPODIUM Linn.

Roots fibrous, not tuberous. Leaves all cauline, small and simple, usually imbricating.

Species about 100.

L. CLAVATUM Linn.

Main stem creeping, 30–120 cm. or longer, leafy; sparingly rooting and horizontally branching, and sending up aërial stems. Leaves crowded, incurved, mostly bristle-tipped, the lower toothed, the upper subentire. Spikes 1–4, cylindrical, on long, 8-striate peduncles. Spore-cases reniform. (B. & B., I, p. 43.)

(Eurasia; N. Amer. to S. Amer.)

L. CLAVATUM FASTIGIATUM Hook.

Branches erect, fastigiate.

Patagon., Fuegia to Cape Horn.

L. CLAVATUM MAGELLANICUM Hook.

Leaves more or less curved, apically awnless.[1] Spike solitary and sessile in starved alpine specimens; 2 or more on a peduncle in others. Bracts ovate-lanceolate, acuminate.

(Auckland I.; Campbell's I., Kerguelen); Falklands; Patagonia, Fuegia to Cape Horn (by Hatcher).

L. CONFERTUM Willd.

Stem appressed, about 45 cm. long, rooting and branching; the branches alternate, to 5 cm. long, and alternately branching. Leaves sparse or crowded, linear-lanceolate, acute, secund. Spikes solitary, sessile on ends of ascending branches, 12 mm. long, leafy; their leaves exceeding those of the stem.

(Chili); Patagonia.

[1] In Lloyd and Underwood's Review of N. A. Species of Lycopodium (Torr. Bull., Ap., 1900) this awnless condition of the leaves is mentioned as characterizing *L. clavatum* Linn. when found in the northwest of North America.

L. SAURURUS Willd.

Stem simple or bifid, erect, about 30 cm. high. Leaves sparse, about 8-seriate, lanceolate, acute, concave, entire, closely imbricate.

(Kerguelen, Bourbon, Tristan, St. Helena, Peru); Falklands.

Fam. 10. ISOETACEÆ. Quillworts.

Aquatic or marsh-plants consisting of rosettes of thick grasslike fronds rooting in mud and bearing megasporangia and microsporangia in their swollen, excavated bases.

Species 50, widely distributed.

ISOETES Linn.

The only genus.

I. SAVATIERI Franchet.

Amphibious, the submerged reaching 20 cm. in length; the emersed about 4 cm. Leaves stout, becoming subtetragonal above and spiny tipped. Sheath broad (7–10 mm.), dorsally sulcate, as if 2-lobed. Macrospores white, rugose, the rugæ anastomosing. Microspores brown, muricate, laterally crested.

Magellan, by lakes near Puerto Bueno; at Cape Horn; in W. Magellan, Desolation I. (Dusén).

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